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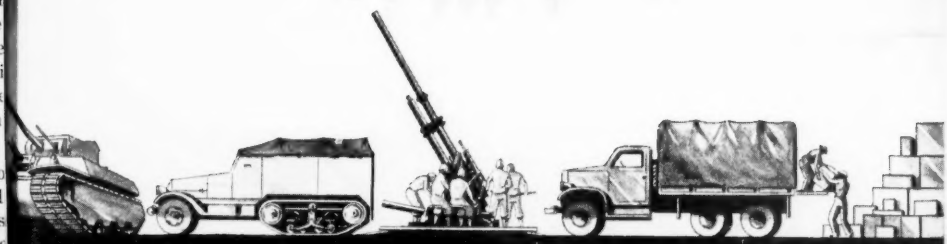

COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

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XUM

VOLUME XXIV OCTOBER 1944 NUMBER 7

COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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Tactical Notes from the Italian Campaign

LIEUTENANT GENERAL JACOB L. DEVERS
Commanding General, North African Theater of Operations

THE campaign of the American forces in Italy falls logically into several distinct operational periods. First was the initial landing at Salerno on September 9, 1943, with its ensuing critical period of consolidation and extension of the beachhead. Then followed the extensive, difficult mountain campaign which carried the advance of our forces to the prepared German winter line, along which there took place a period of stabilized and static warfare on the Cassino-Garigliano front, until May, 1944. A new phase of the campaign was initiated with the landing operation at Nettuno and Anzio on January 22, which developed into a second static period in the Anzio Beachhead. After completion of regrouping and thorough preparations, the static period was ended by the launching of the spring offensive on May 11, which broke the German defenses on the Cassino-Garigliano line, and shortly joined by the breakout attack from the Anzio Beachhead, the advance was rapidly pushed to the capture of Rome. The last stage of the campaign in the period under present consideration has been the pursuit of the German forces north of Rome.

For the American forces, the Italian Peninsula has been a fertile ground for the testing of tactical principles in combat. Of outstanding significance has been the wide experience in the integrated and supporting action of the several combined arms and services, including ground, air, and naval forces. In the mounting, launching, and maintenance of the two large-scale amphibious landing operations the vital importance of close cooperative action among the combined arms was brought out in highest relief. Throughout all phases of the campaign, the support of the ground elements by air units of all types also played a large role in the successful progress of the advance. In any broader consideration of the campaign, it must be borne in mind that the progress and success achieved have been the result of the combined efforts of all forces united in cooperation of the first order.

The heaviest burden has been carried by the ground forces. The land operations in which they have been engaged have varied widely with respect to tactical employment, and also with relation to terrain, climate, and weather. One of the most prominent features of the ground operations has been continuous mountain warfare from the hinterland beyond Salerno to the Alban Hills before Rome. Of equal importance has been close combat in towns and villages. River crossing operations on a scale not before experienced by troops in this theater have also played a large part in the advance of our forces. An important feature of the tactical employment of the ground forces has been the use of massed artillery on a scale and in caliber never before assembled, often in close country where positions have been scarce and crowded, and difficult of occupation beyond any previous experience in this theater. The campaign has been characterized also by the first large-scale employment of tanks and tank destroyers in their secondary role as artillery. The experience of the armor in its primary role has varied from small unit action on special missions to the full-scale operation of an armored division in the breakout from the Anzio Beachhead. Of special importance has been the work of separate tank battalions attached to infantry divisions for numerous different missions in varying situations. Throughout the entire campaign, the infantry, fighting through every type of terrain, over mountains, valleys, and coastal plains, through fortified towns and prepared positions, and across rivers and streams, has been the major decisive element in the advance. In the final analysis, the action of practically all other arms has been directed to its aid and support. Without tanks, artillery, and air, infantry cannot advance. It is the team play which has insured success.

Much has been learned from the wide and

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varied combat experience indicated in the preceding summary of the campaign. From the broader tactical aspect, the principal lessons from Italy have largely served to re-emphasize and reinforce the major conclusions drawn from the previous campaigns in Tunisia and Sicily: that our basic doctrine and teachings are fundamentally sound and have been proven correct on every battlefield in the theater. The main lesson above all else has been the necessity for appropriate application of these principles, with judgment, flexibility, and due consideration of the individual situation. The campaign has emphatically demonstrated that the "book" must not be learned and applied merely by rote. It must be regarded as a broad guiding framework of general principle, to be used and applied as the situation demands. This lesson has been well expressed in a recent comment by the Commanding General, 88th Infantry Division, whose troops saw their first action in Italy and participated with outstanding success in the May offensive. It is quoted here as representative of the opinions of many senior field commanders on this point:

> . . . The doctrine and principles laid down in our training literature are sound and have been proved correct in this Division. They must, however, be applied with judgment and flexibility, and they must be varied in application according to each situation. Bookish, rigid application of any tactical principle will lead only to mistakes and reverses. We must seek flexibility above all else.
>
> In the early period when this Division took over a relatively quiet sector before we launched the May offensive, the gradual breaking-in that the men received was invaluable. Of particular importance was the fact that the men learned to appreciate fully that the principles they had learned in training, both individual and unit, were sound and applicable to the battlefield. This appreciation gave them the needed confidence in their training, in themselves, and in their officers. . . .

In almost identical terms the Chief of Staff, VI Corps, stated shortly after the capture of Rome that "the outstanding lesson in this Corps has been flexibility in the application of standard tactical doctrine. You must fit the established principles and organization into the given situation."

Another major lesson which has been applicable throughout the entire campaign has been the need for a higher level of proficiency in infantry-tank cooperation. Particular stress was given to this subject in the preparations and training before the May offensive. This training effort and special preparation paid dividends in the attack which followed, especially in the break-out operation from the Anzio Beachhead. Concerning the action of the attached tanks in this operation, the Commander of the 45th Infantry Division reported after the fall of Rome that the infantry-tank cooperation during the attack had showed a marked improvement, and that the highly aggressive employment of the armor had been a powerful factor in the success. This improvement was generally attributed to careful training of the infantry battalions with the tank elements that were to work with them in the attack. This special preparatory training, conducted behind the lines within the Beachhead, was thus described by the Assistant Division Commander:

> . . . Within the Division we took each battalion when it was out of the line and worked it with the elements of the tank battalion that was to work with it in the attack. We taught the infantrymen the capabilities and limitations of the tanks, the difficulties of observation from within the tanks. We taught them how the two arms must operate together, and how the infantryman must designate tank targets with smoke and tracer fire. Also, we trained the infantry and tankers in communication with the SCR 300, and worked the two arms together so that they could operate as a real team. The results during the attack out of the Beachhead were excellent. . . .

Within the 1st Armored Division, similar experience has been reported in the attack out of the Anzio perimeter. The Division went into the attack operating in two Combat Commands, with the armored infantry regiment of the Division attached to one, and a regiment from the 34th Infantry Division attached to the other. The preparatory training for the combined infantry-tank attacks of these Combat Commands was carried out with great thoroughness. The operation was planned in meticulous detail, and all elements received practical training together. This training included complete rehearsals, several times repeated, to smooth out mistakes. Detailed briefing, including the use of unit sand tables, was conducted for all personnel down to each tank commander, and the infantry of both commands received their training with the tank units with which they were to work. This period of preparation for the attack has been referred to by the Chief of Staff of the Division as "the greatest piece of planning and training in armored history."

The results of this preparation were highly satisfactory. The attack of the Division was completely successful. One factor in the success of one of the Combat Commands, in addition to the careful planning and training, was the first use in combat of demolition "snakes" to eliminate two strongpoints located at critical positions. These proved to be most satisfactory, and the Division Commander later stated that he regretted that more of these weapons were not used. Another noteworthy element in the success of the attack was the formation adopted for the employment of the armor and the infantry. The leading waves were composed of medium tanks which overran the enemy positions, taking losses as necessary to drive home the attack. Then followed the infantry closely supported by light tanks. Any determined enemy infantry, or pockets of resistance which had not been wiped out by the leading mediums, were then disposed of by the strong combination of infantry and light tanks which followed. Thus the possibility of attack by remaining enemy forces on the following infantry unsupported by armor was eliminated. Also, the infantry was able to keep up sufficiently well, aided as it was by the light tanks, to provide a consolidating force for the ground overrun by the medium tanks in front. This combination and formation for attack was continued in operation throughout the advance until the action passed to the pursuit phase north of Rome.

For the first time in our operational history, tankborne infantry was employed in the attack out of the beachhead, and later in the pursuit phase. The employment of the two arms in this manner was found especially useful for mopping up strongpoints and centers of resistance in order to assist forward the main advance. In one Combat Command, groups consisting of platoons of medium tanks carrying infantry were used effectively for this purpose. In some instances tankborne infantry were carried into action for other missions, notably for consolidating ground taken by the armor, and in certain phases of pursuit. This practice gave the advantage of getting the riflemen forward rapidly for this purpose, and it was also effective as a means of bringing up quickly the heavy weapons needed to support the consolidation. Tankborne infantry was also used in the 45th Infantry Division, and the Assistant Division Commander has stated that the results were excellent. One general disadvantage noted in the employment of infantry carried on tanks was the difficulty of reorganization after dismounting and deployment. Proper squad and platoon organization could not be maintained while the riflemen were carried forward on the tanks, and consequently after dismounting for deployment and action some reorganization was required in each instance.

In the pursuit phase, the experience of the armored Combat Commands produced several lessons worthy of note. Initially, reconnaissance elements employing normal reconnaissance vehicles were used. These, in a situation in which the general location of a withdrawing enemy was known, proved to be too vulnerable to the fire of hostile delaying

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groups. Medium tanks were then placed in the spearhead of the pursuit elements. Within the Combat Commands, "pursuit teams" were organized, consisting of small, flexible forces generally composed of a reconnaissance platoon, a platoon of medium tanks, a company of infantry, an armored engineer platoon, and a supporting platoon of tank destroyers. The medium tanks, except for the first four or five in the advance, carried the infantry, which would dismount and deploy to aid the tanks forward as serious resistance was encountered. The engineers (equipped with tank-dozers) following were brought forward rapidly when needed to clear obstacles or demolitions, and the supporting tank destroyers were used for general support and covering fire when necessary.

Although the employment of the "pursuit teams" or the armored Combat Commands was generally satisfactory, higher commanders have emphasized the familiar principle that immediate deployment, wide envelopment, and bypassing of resistance and delaying positions are essential whenever the terrain permits. In many instances these tactics were not carried out with sufficient energy and dispatch, especially among the elements of the several infantry divisions supported by separate tank battalions. Reporting on the lessons of the campaign from the Garigliano River to Rome, the Commanding General, II Corps, has declared that

> . . . The delay caused us by small enemy detachments has been out of all proportion to the numbers and means at our disposal. Among other errors committed has been our failure to leave roads soon enough and to make a wide enough envelopment or bypass. . . . The combined use of armored and infantry units has been too cautious. Too often a column of tanks has remained inactive on a road, held up by a single self-propelled or antitank gun. The time lost by waiting for the infantry to arrive, deploy, and attack could have been reduced by a rapid deployment and movement of the tanks or by a wide envelopment. . . . Likewise, relatively large groups of infantry have been long delayed by a small group with a machine gun or two astride a road. Again, the time wasted waiting for the arrival and action of tanks could have been materially reduced by early and wide deployment. . . .

A number of senior field commanders have commented on the use of massed artillery of all calibers, often reinforced with the fire of tank destroyers, as a major element in the success of the campaign, especially in the May offensive. The Assistant Division Commander, 45th Infantry Division, in referring to the breakout from the Anzio Beachhead and the advance to Rome, declared that

> . . . In this operation an outstanding factor giving success was the massing of artillery fire of all calibers, made especially effective by unrestricted ammunition supply. The greatest assistance has been given by the overwhelming weight of this fire power, particularly the heavier general support and reinforcing artillery. These units were invaluable in breaking up strongpoints and neutralizing positions in thick-walled houses. . . .

Specifically, the artillery lessons of the campaign followed the general pattern of those drawn from previous campaigns, and reiterated many of those learned in Sicily. Above all, the main element of success has been flexibility in all phases of combat—in employment, in fire control, in communications, and in the use of forward observers. Constant and resourceful use of air observation aircraft has also played a leading part. In the static period before the May offensive, counterbattery action proved to be a most important function. The detailed techniques developed in the Corps counterbattery sections were highly effective.

Within the infantry divisions the outstanding lesson-experience has been the application and modification of standard basic principles to meet the requirements of a continuous mountain campaign conducted for long periods under severely unfavorable conditions of terrain, weather, and climate. Large-scale

river crossing operations in the face of resistance, and combat in towns and villages peculiar to Italy may be said to constitute the next important elements of the infantry action after mountain warfare. In the May offensive, mountain fighting, with its problems of logistics, supply, and communication, continued to the seizure of the Alban Hills. In the non-mountainous areas traversed during this advance, the major lesson, above emphasized, has been the necessity of cooperation with armor.

In the attack of strongly held towns of the type prevailing in Italy, several principles have been brought out in strong relief. Direct, frontal assault, even when assisted by powerful artillery fire and air bombardment, has often proved costly and ineffective. Whenever the terrain permits, bypassing and outflanking should be the rule. With reference to the advance from the Garigliano to Rome, the Commander of the II Corps reported as a major lesson on this point that

> . . . Towns must be taken from deep flank and rear. The usual practice of battering towns with air and artillery serves little purpose, and is extremely wasteful in ammunition and time.

The classic example of this was the bombardment of Cassino in March, which should have been closely followed by direct assault by the infantry supported by armor. The attack, despite the weight of the combined air and artillery, did not succeed, principally because sufficient infantry did not lean on the artillery barrage. From the operation, definite lessons have been drawn. These have been summarized as follows in a report of the Army Commander, and have been substantially repeated in similar terms in a separate report prepared by the Air Commander:

> . . . The town of Cassino was not only fortified, but use was made of cellars and tunnels. Despite the tremendous air effort, our infantry were met by a determined enemy in well fortified positions. It follows therefore that no aerial bombardment alone can clear a fortified area of infantry who are well dug in. The heavy bombing hindered our advance by cratering and blocking of routes with debris. Due to cratering, few tanks could enter the town. The tonnage of bombs dropped must be carefully considered in the ground plan of action, as debris and cratering hinders the action of armor. The follow-up must be immediate and aggressive, employing the maximum infantry strength available. . . . Too great reliance was placed on the bombing to do the job alone. . . .

The spectacular success of the May offensive which terminated the long period of stabilized warfare and broke all German reristance along the winter line deserves comment. From the broad tactical viewpoint, the success of this large scale operation resulted from a combination of different elements, all of which contributed to the rapid advance of our forces. Foremost among these was the careful and detailed planning and preparation that preceded the general attack. Of equal importance was the fact that the attack was launched in sufficient strength in every sector of the line. The key to the success of this offensive, the Chief of Staff of the VI Corps later declared, "was the use of our forces in sufficient strength at all points." Without question, the artillery support, employed especially against the enemy reserves and unit communication centers and systems, was a most powerful influence in the success of the initial attack. Tactical surprise on a large scale was also achieved, in that the attack was general, and for considerable time it is apparent that the enemy was unable to determine where the main effort was to be made. With his communications strangled and disrupted by the artillery preparation and extensive air bombardment, the enemy was unable to control or effectively employ what reserves he had at his disposal, and at every point he was confronted by attacking forces in strength that could not be withstood. Another important element was the effective use of accurate G-2 information in the planning of the attack generally. During the stabilized period, much detailed and valuable data were

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accumulated concerning the strength and disposition of the enemy reserves. Full use of this information was made in planning the attack and directing the strongest effort against critical points where his reserves could not be employed in strength to stem the assault. The air cooperation, declared the Fifth Army Commander after the fall of Rome, "was magnificent," and in a message to the Commander of the XII Air Force, he further stated that

> . . . Taken from my point of view, this has been a demonstration of air support of the Ground Forces approaching perfection. The XII Tactical Air Command and all other units which have engaged in these operations have at all times given immediate response to every call for assistance, with prompt and effective results which have caused great damage to the enemy's supply line and troops. The aggressive action of the supporting air units has enabled us to show the enemy how irresistible the air-ground combination can become. . . .

It was the preliminary stage covering a period of one month when the tactical and strategic air forces were working on communications and supplies—the former on the inner circle to include the Apennines, the latter on the outer circle to include the Alps—that destroyed the German cohesion. Every rail line was cut and stayed cut most of the time; important bridges were destroyed. From the time the attack started the dive and medium bombers worked on the German reinforcements to such an extent that divisions were delayed for days and thoroughly chewed up when they finally got into the fight.

The part played by the Air Forces in preparing and supporting the attack and in contributing to the unbroken advance cannot be exaggerated.

Finally, the really outstanding lesson is leadership. Without it success is not attainable. Officers and noncommissioned officers must be replaced ruthlessly regardless of friendships, if they do not possess ability to lead and command their men. It starts with the highest commander and goes to the lowest. What is leadership? If you are able to understand him, Socrates gives you the idea. In simple language it can be expressed as follows: Leadership is getting the job done today, not tomorrow, with the tools at hand.

Initiative

From an article by Major General Costello in *An Cosantóir* (Eire).

INITIATIVE is action in accordance with the general purpose or object prescribed. Action which is contrary to orders, and which is not genuinely thought to be necessary, is not initiative; it is disobedience. Initiative is not license. The following conditions for the exercise of initiative have been prescribed for the British Army:

(i) A formal order will never be departed from, either in letter or in spirit, so long as the officer who issued it is present or there is time to report to him and await a reply without losing an opportunity or endangering the force concerned.

(ii) If the above conditions cannot be fulfilled, a departure from either the spirit or the letter of an order is justified if the subordinate who assumes the responsibility bases his decision on some fact which could not be known to the officer who issued the order, and if he is satisfied that he is acting as his superior would order him to act were he present.

(iii) If a subordinate neglects to depart from the letter of his orders when such departure, in the circumstances of subparagraph (ii) above, is clearly demanded, he will be held responsible for any failure that may ensue.

(iv) Should a subordinate find it necessary to depart from an order, he will immediately inform the issuer of it, and the commanders of any neighboring units likely to be affected.

Some Technical Aspects of an Opposed River Crossing

MAJOR JOHN M. ERICSON, *Corps of Engineers*
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WHAT do the names Rhine, Marne, Meuse, Don, Danube mean to the men of an army? They are only a few of the rivers well known to all military men, which have affected military operations down through history. To these names might be added the Volturno, Garigliano, Bug, Dniester, Dnieper, and others recently seen in our daily newspapers. All of these rivers and many others represent many a bloody battle with innumerable lives and tons of equipment lost, just to get across a strip of water. Hundreds of small streams and canals should be added to this list of names, as they also must be crossed by military forces. They all represent obstacles to the movement of the armed forces, and a definite part of many a defensive plan. Each of these water courses presents a different problem to the force which must cross: first, a tactical problem to the fighting troops; second, a technical problem to the engineers who must get our troops, equipment, and supplies across, as well as providing for return traffic. All opposed river crossings are truly a combined operation, and every branch of the service must be considered in the planning phase. A river crossing definitely is not solely an infantry or engineer problem. The tactical situation always governs the entire operation. In some cases the technical engineer considerations may be critical factors in deciding on the tactical plan.

FIGURE 1.
SIX-MAN PNEUMATIC RECONNAISSANCE BOAT.

One of the first operations to take place is a very detailed and comprehensive reconnaissance of the river, its banks, and approaches on both the near and far shores. This reconnaissance will largely be made on foot. Small parties must cross the river in small pneumatic boats or by other means, including swimming, to obtain detailed information of the terrain, of enemy dispositions and fortifications, and especially of mining operations. Figure 1 shows an example of a small pneumatic reconnaissance boat which might be used to cross the stream to get this information. In some situations strong combat patrols may be required to cross the river to secure adequate information.

The air force can assist the ground troops in this reconnaissance phase by taking low oblique photographs of the river banks, particularly at critical points on the far shore. In some cases they may be able to provide continuous photographic strips of the river banks in the form of overlapping pairs for stereoscopic inspection. High-altitude vertical photographs might also be obtained to verify or correct the existing maps of the river crossing area, and also to provide information of the enemy.

What type of information will be sought for by the ground troops? The infantry will be looking for covered routes of approach to assembly areas on the near shore which will provide concealment. They will seek positions from which they can fire their machine guns to give supporting fire to the assault troops if required. All of the factors of terrain must be utilized to assist the infantry in their fight. The artillerymen will be selecting ob-

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servation posts and firing positions and beginning their surveys. The engineers will be searching for suitable assault crossing sites, for ferrying sites, and most important, for possible bridge sites. Routes of approach to the river and exits from the far shore must also be carefully looked over. The engineers will also endeavor to determine the extent of enemy antitank and antipersonnel minefields on both sides of the river. Representatives from each arm of the services which are to participate in the operation will have certain things to look for. All of this reconnaissance must be accomplished with the maximum of secrecy, as an active enemy will do everything possible to prevent this reconnaissance being made. It is necessary to maintain secrecy for two principal reasons: first, to deny to the enemy any indication of the intended location of the river crossing; second, to avoid casualties to the reconnaissance parties. To obtain complete detailed information it is necessary that the near shore is firmly in our hands.

In addition to obtaining information by reconnaissance, another very valuable source of information must not be overlooked. Local civilians, if at all friendly and if questioned properly, can provide a great deal of information of the river and adjacent terrain, of the enemy's dispositions, and of enemy activities such as fortification work, minefields, etc. Prisoners of war, if properly interrogated, can provide much valuable information. Oftentimes captured documents and maps may prove to be of value.

When the reconnaissance is completed, the unit engineer, the field artillery representative, and other staff officers will submit their recommendations to the commanding general or the G-3. Each recommendation must be considered by the G-3, and an over-all plan formulated which will insure the maximum success. Then the orders must be written, or, as will often be the case in the field, oral orders will be given. These orders must be detailed enough to insure success in the operation but still allow each unit commander enough latitude in his own sector of responsibility. This entire period may take days in an opposed river crossing. However, the reconnaissance and planning phase should be held to a minimum when the success of a rapid advance far outweighs the risks involved in a hasty plan.

When the orders have been issued, the troops and equipment will be moved into their final assembly areas prior to the crossing. All means to secure secrecy during this phase must be utilized. Carefully planned feints and demonstrations can be effectively employed.

As is indicated in our field manuals, in many military articles, and in actual military operations, there are usually three successive objectives to be gained on the enemy side of the river. The first is a position the capture of which will eliminate effective direct small-arms fire upon the crossing front. The second objective is a position the capture of which will protect the selected ponton-bridge site from ground-observed artillery fire, and

FIGURE 2.
M-2 PLYWOOD ASSAULT BOAT.

which can be supported by light artillery on the near side of the river. The third objective is an area the capture of which will protect the bridge site from all artillery fire and will provide proper maneuver space on the enemy side of the river.

The actual crossing means, as provided and operated by the engineers, has been designed to transport the men and equipment across the river to gain these three successive objectives. Let us see how our engineers might operate and what equipment they may use in an opposed river crossing operation.

To eliminate small-arms fire in an opposed river crossing, it is necessary to make an

assault crossing. This crossing might be made during the hours of darkness, or by the use of a covering smoke screen. The standard means used to get the assault troops across is the assault boat (Figure 2). This boat will transport an infantry squad or its equivalent, such as a mortar squad, its mortar, and some ammunition. It will be controlled by three engineer soldiers in the boat, with the infantry soldiers doing the paddling and one engineer soldier acting as a guide on the near shore for the returning boats. Other means which

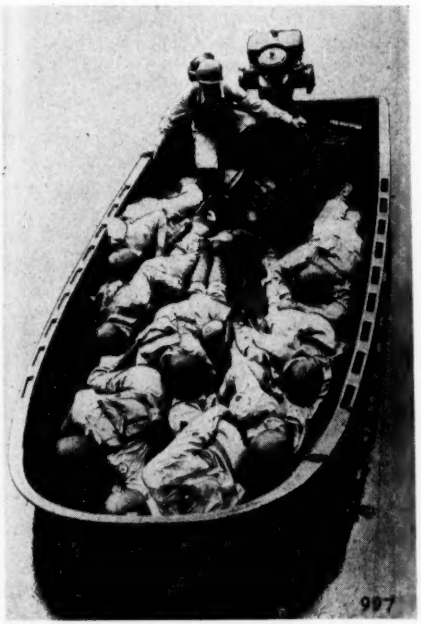

FIGURE 3.
PLYWOOD STORM BOAT.

might be used are reconnaissance boats, pneumatic floats, storm boats (Figure 3), or other improvised or locally procured means. The pneumatic floats can be used when the standard plywood boat is not available in sufficient numbers. However, it is a bit hard to handle in a swift current. The storm boat is a high-speed boat powered by an outboard motor. It is valuable in wide stream crossings and also in moving upstream or downstream to a sector where the enemy might not be expecting an attack. The storm boats should only be used when secrecy is subordinated to

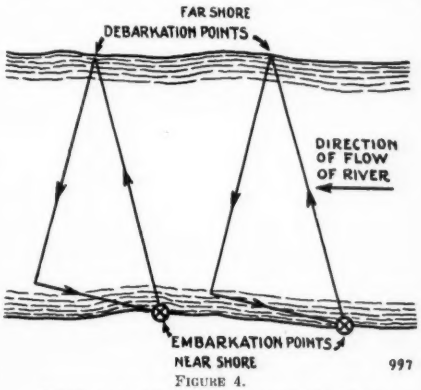

FIGURE 4.
DIRECTION OF MOVEMENT OF ASSAULT BOATS IN CROSSING A RIVER.

speed. Another means of crossing is the foot bridge. The foot bridge can be erected very rapidly and can cross many troops in a short time. It can be and has been used for the assault crossing of narrow streams. Its construction is difficult under small-arms fire and it is reserved usually for crossing succeeding waves of foot troops after the first objective has been attained. It is not practical to use the foot bridge in wide, swift rivers. This assault crossing must be very carefully planned, and executed with perfect timing. Assembly areas for the assault troops and for the boats must be carefully reconnoitered and properly marked, and guides must be posted. The boats must be where the troops will easily be able to pick them up and launch them. The very vital element of surprise must be incorporated into the over-all plan if our troops are to get across the river with a minimum number of casualties.

The engineer soldiers who guided the infantry to the launching site and supervised the actual paddling across the stream now bring the boats back to the near shore to take across additional troops. Here again detailed plans and timing are necessary. If the boats

return to one place on the near shore and the infantry troops are at another place, much valuable time will be lost.

The route usually followed by the assault boats is shown in Figure 4. For better control, the same embarkation points should be used for each successive wave.

Not only will infantry soldiers be crossing in these assault boats, but other troops must cross early. Engineers will be needed to assist in breaching obstacles, clearing mine fields, and opening up supply routes for supporting ammunition and supply vehicles, tank

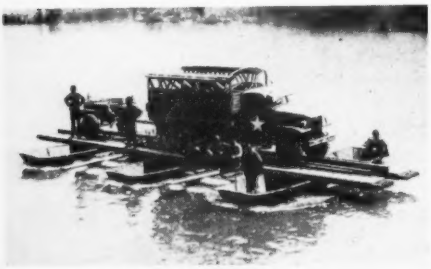

FIGURE 5.
INFANTRY SUPPORT RAFT REINFORCED BY PNEUMATIC FLOATS AND POWERED BY TWO OUTBOARD MOTORS.

destroyers, tanks, and other vehicles which will be required to support the attack. Artillery forward observers must get across to control the supporting artillery fire. Signal Corps men must get their telephone lines across. These and others must all be considered in the plans.

If the river crossing is to be successful it is important that antitank guns, tanks, artillery, ammunition, and other supporting means get across in the early stages of the operation. Therefore, as soon as the assault waves have crossed and have advanced far enough to eliminate effective small-arms fire, these supporting weapons must get across the river. It will usually take too long to build a bridge, and also vital bridging equipment must not be exposed too soon to the disastrous effects of enemy observed artillery fire. To get these supporting weapons across, the engineers can construct ferry rafts. The rafting sites should *not* utilize the same approaches as are planned for the ponton bridges, as there will be too great a concentration of vehicles and equipment, which will result in traffic congestion and will provide a good target for the enemy. The infantry support rafts can be built in a very short time, using the same assault boats which crossed the infantry, plus plywood treads. These rafts might be reinforced by using pneumatic floats as shown in Figure 5. Rafts using up to seven boats can be constructed to carry a 105-mm howitzer and its prime mover, two 2½-ton trucks, or similar loads. The pneumatic bridging equipment can also be used to build rafts. In order to get medium tanks across, the steel treadway raft must be used (Figure 6). This raft takes a little longer to build and the parts cannot be man-handled, but it is very efficient to get tanks across in a short time. Rafts built with parts from the 25-ton ponton bridge are also capable of carrying a medium tank. These rafts usually are driven across using one or more outboard motors or utility power boats. In a stream with little or no current, they can be paddled across. In a stream with a current exceeding two miles per hour, a cable can be stretched across the river and a trail ferry set attached, thus using the current to propel the raft across. A flying ferry utilizing an upstream anchor can also be used in a similar manner.

Not only can these rafts be used to get across the supporting weapons and vehicles, but also they can be utilized on the return trip to bring back casualties.

It is very important that the second objective has been attained—which means that enemy observed artillery fire has been eliminated from the bridge site—before work is started on the construction of the ponton bridges. Adequate replacements of material must be available in the immediate vicinity. Reports from the theaters of operation indicate that one hundred percent reserve should be provided when pneumatic ponton equipage is used. When our troops crossed the Volturno River in Italy, a ponton bridge was begun in the early stages of the crossing.

However, our assault troops failed to mop up the enemy properly, and this bridge came under small-arms fire with very disastrous results.

There are several bridges which are standard equipment and which are designed for particular usage. The M-3 pneumatic bridge (Figure 7) is transported in standard 2½-ton trucks and trailers and can be rapidly built by hand. Air compressors are used to inflate the floats. This bridge with normal construction will take practically all loads of the infantry division. When reinforced construction is used, light tanks can cross on this bridge.

Another bridge is the 25-ton ponton bridge. The pontons are very bulky and are transported on semi-trailers. When this bridge is reinforced, medium tanks can be crossed. It is a bridge which will stand up under heavy traffic, and many vehicles can cross rapidly.

The steel-treadway bridge (Figure 8) is designed principally for crossing armor. It is transported in Brockway trucks which have a crane to use for the construction of the bridge. Truck-mounted cranes are also used for construction. There have been recent improvements in the design of this bridge to give it better flotation in swift currents, and greater capacity. The maximum capacity of the new bridge is forty-six tons in a maximum current of five feet per second. One of the difficulties with this bridge is that the wheels of all vehicles will not fit on the treadways. This is particularly true of some large trailers and tank-recovery vehicles. This difficulty can be overcome by placing timbers between the two treadways, or by placing decking on top of the treadways. With the increased use of separate armored battalions with the infantry division, all engineer combat battalions should be trained to build the steel treadway bridge. All of these various types of equipment might be used in a river crossing. Exactly what equipment will be required will depend upon the composition of the forces that are to make the crossing as well as those forces that are to cross later to support the attack or exploit the success of the crossing. The factor of availability of equipment and troops in the theater of operations must also be considered.

Thus we have seen how the engineers provide the means to get the troops across the

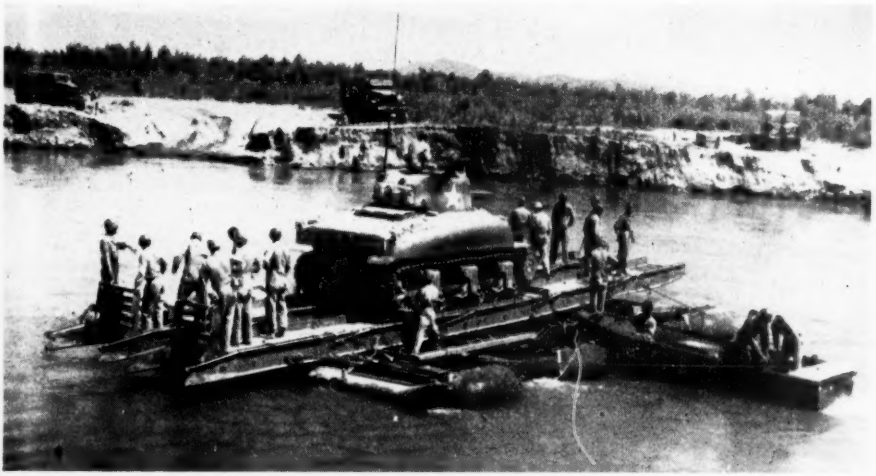

FIGURE 6.
MEDIUM TANK ON FOUR-PONTON STEEL-TREADWAY RAFT.

river. What are some other problems facing the engineers? The matter of reconnaissance was mentioned previously, during which the engineers will be looking for possible sites which will present a minimum of technical

to the river. The roads or avenues of approach to the river must also be cleared of enemy mines. In order to get this work done, the near bank must be firmly in our hands before the crossing can be attempted. The

FIGURE 7.
M-3 PNEUMATIC PONTON BRIDGE.

difficulties. First, let us consider the approaches to the river on both sides. The existing road net must be used as far as practical, as any new road work near a river will usually require considerable effort and may reveal our intentions to the enemy. In case the existing road net is not suitable, the engineers must plan their work in such a manner that the roads are repaired—or built, if necessary—in time to avoid any delay in the attack. This also means that troops and equipment must be ferried across to work on the exits on the far shore just as soon as the enemy has been driven back far enough. When the British crossed the Garigliano River in Italy they experienced a great deal of difficulty with the existing road net. There were only a few suitable roads and much time was lost due to the inability to get the equipment

FIGURE 8.
MEDIUM TANK CROSSING A STEEL-TREADWAY BRIDGE.

stream banks, if high, will have to be cut down or other bridge and ferry sites located

The stream bed must be adequate to provide proper footing for the trestle spans leading from the shore to the first floating bay. Large rocks and logs may damage the pontons. Islands in the stream require extra work and should be avoided if possible. One of the greatest factors is the velocity of the current. A fast-moving stream can cause considerable trouble to the engineers. The assault boats will be swept down stream, and they may be mixed up, causing confusion when the troops land. The rafts will be hard to handle and extra outboard motors may be required. The bridge itself may be dragged downstream, debris may pile up on the floats or anchor lines, and the floats may be swept from under the bridge or perhaps swamped (Figure 9). The capacity of floating equipage is greatly reduced in swift currents, and plans for the use of the equipment must be adjusted accordingly. These examples are just a few of the many problems confronting the engineers, and it is absolutely necessary to consult the unit engineer before drawing up the plans for a river crossing. The unit engineer will know the existing conditions of the river area and the amount and capacity of the equipment and troops available, and will be able to advise the unit commander of these factors.

There are several ways that the engineers may be employed in a river crossing. Obviously, with the great deal of engineer work involved, the division engineers have to be reinforced by corps engineer troops and ponton equipage. One method of employment of engineers is to attach the necessary engineer units and equipment to the division, and let the division not only control the assault crossing and ferrying operations but also control the construction of any ponton bridges. When this method of employment of engineers is used, an engineer combat group, composed of the necessary engineer combat

FIGURE 9.
THE RESULTS OF OVERLOADING A STEEL-TREADWAY BRIDGE IN A SWIFT CURRENT.

battalions and ponton companies or battalions, might be attached to the division. It is desirable, in a river crossing operation, to have an attached engineer combat group headquarters to assist in the control and supervision of the engineer operations. It is also desirable that this group be composed of the necessary engineer units for the river crossing even if it does mean detaching or attaching engineer units to the group. If a division has an engineer combat group attached, the problem of command always arises. The division engineer should still operate in his capacity as the engineer special staff officer on the division commander's staff. The division engineer might then control the engineer part of the assault crossing, close-support ferrying operations, and engineer support on the far shore. As division engineer he should then recommend to the division commander that the attached engineer combat group commander have the responsibility of the ponton bridging operations and the construction of approaches to the bridge sites. The division engineer can then concentrate on the other phases of the operation, particularly supporting the advance on the enemy shore.

If the enemy has strongly fortified his side of the river, or if the terrain is extremely difficult, or any circumstances exist where a large proportion of engineers are required immediately on the far shore, a different assignment of engineer tasks might be used. In this case, all the engineer river crossing phases might be given to the engineer combat group commander directly under the control of the division commander. The division engineers would then merely cross the river in the assault boats or on the rafts, and concentrate their entire operations in supporting the attack on the far shore. Thus, the engineer duties and responsibilities would be organized and divided in a similar manner as is done in an amphibious operation. The engineer group combat commander might then be called the "river crossing engineer," and act in that capacity on the division commander's staff. Reports of maneuvers in this country and of actual combat operations overseas indicate that this last method of employment of engineers is very satisfactory.

Another method is to attach to the division only enough combat engineer units and ponton units to cross the assault troops. Or perhaps enough engineer units may be attached to cross the assault troops and provide close-support ferrying operations. This portion of the engineer work would then be under direct command of the division engineer. The construction of the ponton bridges would then be kept under corps control, thus relieving the division engineer of that responsibility. Whatever method of attachments is used, provisions must be made for the reversions to unit commanders when the various phases are completed.

Regardless of the method of employment of engineers in a river crossing operation, very close coordination and cooperation must be exercised between the division engineer and the attached or supporting corps engineers. There must be no antagonism or conflict of personalities if full engineer support is to be provided throughout the operation. In practically every situation in the theaters of operation, modifications of the above methods will have to be made to meet the particular situation. Flexibility and ingenuity in using the available means should always be utilized.

In addition to character and instruction, the commander must have a love for responsibility which, according to the Regulations for the Conduct and Combat of Combined Arms, "is the most noble quality of the commander."

—General Leopoldo Mendez Lopez in *Memorial del Estado Mayor General*, Colombia.

Chain of Command and Responsibility

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Chief of Staff, 99th Infantry Division

DON'T read this article! It is just a rehash of primary stuff that every soldier has known all this time. But pause, soldier, for although the exposures contained herein are elementary, they are seldom fully understood, rarely appreciated, and never completely applied.

These few remarks are based on conclusions made after fifty-four years of observing the Army from the point of view of an Army boy and during thirty-six years of actual service with the National Guard and the Regular Army. Should the conclusions here presented bear any similarity to those of others, living or dead, put it down to pure coincidence. Should anyone differ radically with the assertions made herein and operate on his own scheme, that person will not get results; that is, not complete results which will pull his outfit up, in spite of itself, to approach a standard of perfection that is as high as Old Glory on the flag pole.

Undoubtedly George Washington, during such time as he was able to meditate at Valley Forge, harped on the subject of chain of command and responsibility, but did not call it that. Whether George actually followed our line of reasoning and demanded the chain of command as we understand it is not set down in history.

I know from personal knowledge and observation, although it was immature youthful observation, that in the wild west frontier days during the gay 90's many military leaders spent a great deal of time talking about decentralization of command within their organizations. Such colorful soldiers as "Water Closet" Jones, "Slicker Bill" Robertson, "Saturday" Johnson, and "Gunny Sacks" Jamison were continually wailing over the failure or inability of individuals to assume responsibility. They were perpetually seeking ways and means either to establish or strengthen a system comparable to what we now call chain of command and responsibility.

Just what kind of a strange thing is this chain of command and responsibility? And why does it require explanation at this time? In the time between wars, especially when that time is several years, training boils down to a systematic routine during which time there is ample opportunity to develop chain of command. Responsibility, closely welded to chain of command, is assumed by all ranks. High-ranking officers should not care to burden themselves with details. They should be content with making decisions which are rather broad but nonetheless definite. Staff officers and subordinate commanders carry out appropriate parts of the commander's decision and in turn re-delegate or re-assign portions to junior commanders. As a result all echelons will have the maximum amount of time for planning, recreation, or meditation, whichever is preferred.

The same procedure is carried out down through the noncommissioned grades. Personnel does not turn over quite as rapidly in time of peace as it does during war. Both noncommissioned officers and officers are able to assume more responsibility and to demand more of subordinates, who in turn have had sufficient time to learn thoroughly the profession and the requirements of the grade or position which they occupy.

Full application of the chain of command and responsibility is a procedure of which the lazy man approves. To be more charitable, it is a procedure which gives commanders, either commissioned or noncommissioned, more time to devote to study, planning, supervision, and the all-powerful "follow-up" which are indispensable requirements in themselves for the attainment of high standards of perfection in any activity or situation in the military profession.

Today, in time of war, units are entirely too large and complex to allow the commander of a unit to run it and its subdivisions all by himself. No commander can fight or train all the little organizations in his outfit, carry the records in his back pocket, and achieve success by that method. It is absolutely necessary for any commander from a platoon

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leader up to the exalted person who commands a group of armies either to delegate or decentralize some of his responsibilities to subordinates or be forced to neglect some of the necessary requirements of training or fighting.

A battalion commander cannot under any circumstances run his battalion by attempting to conduct all the company training or by getting down on his hands and knees and personally training platoons and squads. He must delegate, he must learn to decentralize, if he aspires to be successful.

The Army today is almost completely made up of green personnel. Exception may be taken to this statement; it may be held that a very large percentage are trained Regular Army, National Guard, or organized reserve officers with considerable training, and it may be held further that the bulk of our soldiers have had almost the equivalent of one enlistment. However true these objections may be, insofar as length of service is concerned, it must be remembered that these individuals have been jumped to higher positions very rapidly and in the main are inexperienced in the requirements of the position they are now attempting to fill.

A most important reason for the existence of a tight chain of command and responsibility in a combat unit is that enemy fire is no respecter of rank or position. It falls and devastates or kills where it lands. When a leader's name is on a missile, his time has arrived and he becomes a casualty. There must be an individual present, trained, ready, and designated to step into this leader's empty shoes and continue to fight the unit forward. Organizations cannot stop or even hesitate in momentum because of the loss of an officer or noncommissioned leader. Chain of command and responsibility must be so strong and so understood by all that the second, third, fourth, or fifth in command is ready to grab hold of and lead the unit. As long as there are two men remaining in a unit, one must be assigned leadership or he assumes it, and the other man must follow.

In this war we are up against enemies that are super-tough, tricky, slimy, filthy, sneaking, and at times very clever. If they have deficiencies they may be lack of mental flexibility and a tendency towards stupidity. Guts and training are rarely absent in the enemy. Basically we Americans have become a soft and trusting people. We were happy to live and let live until the Japs dumped their bomb loads onto Pearl Harbor. Then we became hysterically tough, in words only. It has taken us a long time to train and act so that our soldiers can kill without getting killed. Some units have been forced to learn the hard way. Others, we hope, will profit by examples and train to that end. We are proud of our ability to fight until the enemy cracks. The following extract of a letter written by a battalion commander of the 45th Division tells its own story:

> Italy, 4 June 1944. Dear Dad:
>
> Never again do I expect to see fighting as severe as we went through in the past ten days. My battalion was up against the key section of the German last defense line south of Rome. For three days our gains were measured in yards. We were able to get a toe hold on a ridge and had to fight like wildcats to hang onto it. Every afternoon we would get a counterattack. The German mortar and artillery fire was the worst I've seen. But our artillery was terrific. In front of my battalion they threw down as high as 25,000 rounds in two hours. It finally got to be a dogfight to see who would quit first. We were able to stick it out. The Germans finally broke and pulled out leaving piles of dead and surrendering in large groups. We are resting today as other units have taken up the pursuit. Going to grab some sleep now. Just wanted to let you know that I am okay. Mike.

Chain of command is almost the same as order of rank in a unit. It is a series of steps which go down or up depending upon the way that it is traveled. Within a regiment a chain of command starts with the regimental commander and proceeds down by grade to the junior GI Joe in the rear rank of the last

company. Nine times out of ten, chain of command is confused with channels of communication. Many times when officers or men have been quizzed on chain of command in an endeavor to find out whether it was understood, or whether it is operative within their organization, they gave unsatisfactory answers. Quite often the individual quizzed gave as an example an explanation which ran about as follows:

"I receive a communication from higher headquarters. That message is delivered to the captain who in turn delivers it to the lieutenant who passes it on to the sergeant and it goes to the private, perhaps through a corporal."

The channels of communication are correct and are similar to the chain of command. One important point is missed completely. When a commander receives instructions from higher authority he should study them and then reissue his own instructions to his immediate subordinates, in his own language, and as though coming direct from him. Each echelon of commanders follows through on the same scheme until the instructions get all the way down to the GI Joes in the rear rank. In a unit wherein the chain of command is weak, the above procedure may be all that is in operation. The orders are issued—that is all. The assumption is that the order is carried out by some hook or crook, but there is no assurance that it will be carried out promptly or in the fullness that is desired.

Mr. Thomas Edison once said, "Genius is one percent inspiration coupled with ninety-nine percent perspiration." That statement is true and sound when applied to the art of military command and leadership. The quotation is in the correct proportion as well. In the military service any operation boils down to about one percent decision or orders. The ninety-nine percent is the perspiration occasioned by physical and mental effort put out in supervising and by continuous follow-up that absolutely insures that the accomplishment of the inspired decision does not die somewhere along the chain of command.

When a commander does not accomplish results—that is, when he discovers that his orders are not being carried out promptly or that there is a lag in the execution of his directives—he should take immediate steps to test each link of his chain of command and responsibility with a view to finding at what point in the chain his instructions are petering out.

A commander is responsible to his next higher echelon of command for everything that transpires within the unit or organization. He is responsible for its administration, discipline, training, morale, esprit de corps, alertness—in fact, everything connected with the operation of the unit, both in training and in combat. A commander has no one to whom he can pass the buck for failures within his unit. The praise he receives for his unit's accomplishments belong to the unit and to himself. By the same token, criticism must be accepted by him and corrective action taken within his own unit.

Excuses and explanations for failures are seldom listened to; hence, such alibis are a futile waste of breath and effort. A commander has only one line of action open to him when things go haywire within his unit. He has no alternative. The one procedure is to lay his hands on the individual next below him in the chain of command, the individual who commands the faulty outfit, and tear that gentleman's shirt off him. The shirt tearing is speaking figuratively, of course, because sound and effective leadership does not include cursing, hysteria, sarcasm, or loose threatening of any kind. When it becomes necessary to tear the shirt off an individual too often, it is high time to get rid of the individual by means of reclassification or, in the case of noncommissioned officers, reduction to the grade of private. No commander can afford to keep individuals with stripes on their sleeves or insignia of commissioned rank on their collars for sentimental reasons. It is stupid, dangerous, and murderous to retain inefficient personnel. From the selfish standpoint, a commander cannot afford to have junior leaders under him who do not deliver the goods one hundred percent at all times. Failures on their part reflect unsatisfactorily upon the unit commander's leader-

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ship, judgment, and common sense, and draw for him a low efficiency rating. It is impossible for a unit commander to be rated superior continuously when he is supported by inefficient subordinates who are knowingly retained and protected. The efficiency rating of a commander is not the governing reason for maintaining qualified personnel; but the responsibility for the lives of a command is.

At this point there comes to mind the oldest pun in the English language. This pun can be used to illustrate a point in the chain of command. It is as follows: "The vicar told the sexton and the sexton tolled the bell." The vicar might have told the sexton and then the vicar might have tolled the bell himself while the sexton sat on his fanny and whittled, feeling it was no use humping himself when the old man wanted to do everything on his own. This method illustrates a lack of chain of command or a very weak system at least. However, let us assume that the vicar told the sexton and then told the deacon, a principal staff officer, to follow up on the sexton to insure that the sexton tolled the bell properly and at the specified time, after which the deacon should have told the old man that the toll was accomplished and exactly as the sexton was told to do it. This, it is hoped, will illustrate in a small way a strong chain of command which, as said before, includes follow-up and supervision.

So far in this article stress has been laid on chain of command. Its running mate and inseparable companion, chain of responsibility, must be clarified to keep the picture clear. Starting at the bottom with a squad, the basic military unit, chain of responsibility must be established. From the squad up it is pyramided and dovetailed into the complete fighting unit. A squad consists of a small number of men commanded by a noncommissioned officer. A noncommissioned officer is a soldier in whom the confidence of higher authority has been placed and upon whom the next superior leader has delegated the entire command responsibility for the squad.

The squad leader must assume every responsibility for the squad including each of its individual members. It is not sufficient for a squad leader to place himself at a road crossing and call upon his squad to fall in—counting eight of the twelve men present and reporting to higher authority that four are absent. If that is all a squad leader considers necessary to start the period's work, he has missed the boat entirely.

A squad leader must know his men. It is an old requirement that leaders call the roll from memory. A squad leader must know the habits of his men and, along with the knowledge of their habits, he should be familiar with the personal trials and tribulations of his individual soldiers. He should know where each individual is likely to spend his off-duty leisure time and with whom he is accustomed to associate. He must take into consideration periods of depression which his men might have because of marital troubles or family financial entanglements. The squad leader is, in fact, the Simon Legree, father confessor, business adviser, legal guide, and, at times, the family doctor for every member of his small command.

Long hours before it is time to assemble his squad at the appointed place, the squad leader should know that his men are in the vicinity and that they have every item of their equipment or that shortages have been previously reported. When the appointed time for assembly is at 0600, squad leaders should check their men the night before to make sure they are safely tucked into their bunks or foxholes as the cases may be. Should he discover absentees, he would know approximately where the absentees could be found. His thorough knowledge of each man would lead him to assume an absentee of his would be found at the Blue Front Juke Joint on Fourth Street, just on the edge of the off-limits area, with a pint of bootleg in his pocket and a blond on his knee. Not even there does the squad leader's responsibility cease. He should undertake to round up the absentee, drag him home, and slap him into bed. This all takes time and effort on the part of the noncommissioned officer and seems unjustified; however, the smart noncommissioned officer will not stand for such annoy-

ance very long but will take steps to cure the individual or to punish him or to get rid of him by authorized methods. Just prior to the appointed time for assembly the squad leader rounds up his gang in the barracks or in the woods. Some he knows must be awakened by rough technique because they are deep sleepers; others he can quickly arouse knowing that they are completely equipped and turned out and he can get them to help him to assemble the others. His mission is properly accomplished when he moves his rounded-up squad to the point of assembly, faces about, calls his roll from memory, and reports all present, properly equipped and ready for any eventuality.

In the matter of training, the squad leader acts very much in the same way as a primary grade teacher trains his or her pupils. Some learn fast while others are slower. The more intelligent group can be set to such things as reading and being tested on their progress or can be lectured to and then be given weapons to disassemble or operate with. The slow members of his squad must be coached and given special instruction and examined in a systematic way to keep their morale high while the instruction is being implanted in their system. The very same method is applied to each higher unit except that as the strength of the unit increases and the number of subordinate organizations increases it becomes more difficult for the leader to know personally all of the characteristics of the men under his command. But the leaders who have subordinate units under them must lean heavily upon the squad leaders or the platoon leaders or the company commanders and deal directly, and emphatically, and solely with the leaders in the next lower echelon. Any time that a commander dives down into a lower unit, bypassing his subordinate commander, he is definitely undertaking work which does not fall within his sphere and is relieving the appropriate unit or organization commander from the responsibility of exercising full command or responsibility.

Nothing in this discourse is intended to prohibit a commander from observing and inspecting the training or operations of units several degrees below him in the echelons of command. A colonel may observe and criticize the work a squad is striving to accomplish, but when he desires to make criticism and changes the colonel should not pick on the squad leader. In this case the colonel should round up the battalion commander on the spot, if possible, or call the battalion commander to his office at a later period and then point out the deficiencies to the battalion commander, rub his nose in the mess, give him a lead towards the correct solution, and then throw him out the window. Again these words are used figuratively.

Let us accompany a lieutenant colonel whom we shall call "Dumbo" on an inspection trip around and among companies, platoons, and squads of his battalion and let us observe his methods of command; then let us go around with Lieutenant Colonel Smart in order to observe some of the methods he uses when he finds off-color business going on within his subordinate units.

First Example

Wrong

Lieutenant Colonel Dumbo strides out of his command post accompanied by his executive. The uniform of the day calls for steel helmets. The T/5 driver of Dumbo's jeep is wearing a garrison cap and he is none too clean. Dumbo flies into a rage. He addresses his wrath direct to T/5: "What in hell do you mean by wearing that cap? Don't you know what the uniform is? Get over to your company and get your helmet. Pull off those chevrons because you're busted right now. Etc., etc., etc." Turning to his executive he says, "That's the way to handle things. I told him all right." The executive feels no guilt and "yesses" the old man with a smirk. Net results: Twenty minutes are lost while the officers wait for the driver to change hats and get rid of chevrons. The "Old Man" is all in a mental lather over a trivial matter.

Right

Lieutenant Colonel Smart walks out of

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his command post, bright-eyed, alert, and ready for business. He is discussing the plan of inspection with his executive. The driver of Smart's jeep is also incorrectly uniformed. Smart notes the garrison cap on his T/5 driver, so he says to his executive, "Did you take a look at the jeep and driver before we came out? Why didn't you? Never mind answering that now. I will see you about it when we get in. Make a note to have the headquarters company commander report to me at noon reference the uniform of his men. Let's get going." Net results: Nothing overlooked. No time lost. The executive knows that he and the headquarters company commander will catch dignified hell when high noon arrives.

Second Example

Wrong

Arriving at the Transition Range where firing is in progress, Lieutenant Colonel Dumbo and his executive dismount. No one notices their arrival, which is annoying indeed. Dumbo sends for the lieutenant in charge of firing, who saunters up, salutes sloppily, and fails to report his name, organization, and what his platoon is trying to do. Dumbo has a spasm, goes berserk, and lets go threats of reclassification. It does not occur to Dumbo to find out whether the lieutenant has been properly instructed in the art of reporting. Anyhow, things are not going well on the firing points. One soldier's rifle has not been zeroed. The soldier catches hell for that and Dumbo gives him three hours fatigue for the omission. The lieutenant and the platoon sergeant shiver in the background while the "Old Man" bellows around picking on the privates. Results: Utter confusion. Punishments are handed out which are not recorded and probably will not be applied.

Right

Lieutenant Colonel Smart arrives at the Transition Range. Since chain of command and responsibility is pretty well established in his battalion a soldier spots him immediately on his arrival. The lieutenant in charge of firing is notified at once. He comes up on the double from where he has been coaching. The lieutenant reports name, rank, organization, and a brief of what the platoon is doing. Smart goes around with the lieutenant to check the work. One soldier is shooting with a carbine which has not been zeroed. Colonel Smart says, "Lieutenant, make an immediate check to insure that all rifles and carbines are zeroed. There is no use wasting ammunition and time on men who are not prepared." Then to his executive, "Make a note to have Captain X see me at noon. I want to determine if this is just a single oversight or if it is general throughout the company due to lack of supervision."

Third Example

Wrong

Dumbo's next step is in an area where a platoon is training in offensive combat. There is no depth to the attack. Men are bunched. The platoon leader is on the firing line where he does not have control. The regular platoon sergeant is absent. No acting platoon sergeant has been appointed. It is the same old story. Dumbo separates the men himself. In fact, gets them thoroughly dispersed and many headed in the wrong direction. He restricts the lieutenant to camp for a week. Several pairs of chevrons are ordered off. The platoon is told it is a lousy bunch of bums. What a show! What a show!

Right

When Smart starts looking into the offensive combat training of a platoon in one of his companies he finds about the same deficiencies that Dumbo bumped into. Men are huddled together. There is failure to take advantage of cover. The firing line is a thin line of rifles. Automatic weapons have no targets or field of fire. Many other things are wrong. What does Smart do? He stops everything in place. He directs the lieutenant to send a messenger for the captain with instructions to have the captain report to the battalion commander right then and there. While waiting for the captain to appear Smart quizzes the lieutenant on his education, previous service, knowledge of platoon tac

tics, and other pertinent matters. Smart discovers the lieutenant is young, scared, inexperienced, and has only been in command two weeks. This is his first field exercise. When Captain X arrives, Smart takes him around, showing him the deficiencies. Captain X recognizes the failures. Incidentally, so does the lieutenant by the time the inspection is finished. Captain X makes no excuses. He merely states, "I'll pull the platoon back to the line of departure and start over again. I'll stay with the lieutenant until he is able to apply on the ground what we have studied in schools." "OK," says Smart. "Keep a sharp eye on all your platoons. Come over here, I want to speak to you privately for a moment." They move off out of earshot of the others. Then Smart says, "Your pre-planning and preparation for these platoon exercises may not be all that is desired. The officers and men of your company are not sure of themselves or as well trained as I want them to be. I want you to initiate and vitalize planning, schools, preparation, and then supervise, check, and double check the application on the ground. Don't allow errors to go by without correction. This is the second time I have brought this to your attention. I want improvement at once or I will be forced to take steps in the matter. You understand me, Captain? OK. Get busy."

Fourth Example

Wrong

Fit to be tied, in such a frame of mind that he can't see the forest for the trees, ready to jump on all the little things while ignoring the grosser, more complicated deficiencies, Dumbo returns to his area. He decides to inspect a kitchen before giving up completely.

Since the chain of command in his whole battalion is weak, his kitchen is disorganized and dirty. Cooks and KP's are thick as the flies in the joint. No mess sergeant is on the job. The whole place is littered with the mess of a hit-and-miss method of preparing the noon meal. Dumbo raises hell with each individual. The executive is busy writing down names and serial numbers of the kitchen crew. Dumbo opens oven and ice box doors, slices bread, turns off water faucets, and winds up by restricting the whole gang to the camp for a period of time that sounds like forever in the confusion. It does not occur to Dumbo or his executive to have the captain rounded up so that the mess can be started on its way to recovery on the spot. Dumbo's day is complete. He has seen everything. He has impressed his authority and personality on everyone he came in contact with. It goes without saying that he does not follow up by informing the responsible captains and making them straighten out their organizations. It isn't necessary, he thinks, since the correction has been made on the spot in person. Long since, Dumbo has been reclassified and relegated to the scrap heap. He still wonders why, and is very bitter about the whole thing.

Right

After Smart finishes with the problem, he says to his executive, "Let's take a look at a mess. We have just about time to cover one of them before we assemble the company commanders to iron out our problems."

Things are not altogether as they should be in the kitchen. The mess sergeant is on the job. He sends for the mess officer who reports in a few moments. The mess does not have an appetizing odor about it. Grease traps are clogged. Pans are carbonized. Utensils have hardened food in crevices. There is too much edible garbage in the cans. Among the good items upon which the lieutenant and mess crew are complimented are the lack of flies, clean table tops, and a splendid system of work assignment on a published time schedule which has just been inaugurated. The mess is not lousy, but it is far from the superior standard which Smart expects all of his installations to strive to approach. Smart points out all deficiencies observed to the lieutenant and directs his executive to make notes so that the items can be brought to the attention of the company commander. As he departs from the mess, Smart informs the executive, "My chain of command is slipping in some of its links. I'll have to tear some shirts off at officers call. There will have to

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be more follow-up, attention to details, and supervision. I'll have to crack down on pre-planning, preparation, presentation, and application, and then, as I continuously repeat, supervision, check and double check." Long since, Smart has lost his battalion. He is now commanding a regiment in Normandy. From all reports his regiment is making history. He will be in among the stars one of these days, but that is not bothering him. The job at hand is the primary mission to Smart.

So far, this discourse has dealt with the links of the chain of command between the commander and GI Joe. In closing, a word of final advice to the commander is in order. By his example the commander sets the tone, tempo, esprit, and the standards of his outfit. Very few commanders can get away with eccentricities. A commander has to be good, and I mean really good, to take liberties with uniform or install his own ideas when they differ from regulations or customs of the service. It is not good leadership when a commander chastises an officer for being out of uniform when the "Old Man" has failed to put on his own leggins. The boss has to be damned sure he knows his technique thoroughly before he attempts to demonstrate to a machine-gun crew.

The Army and Navy Team

From the report of Admiral Ernest J. King, *USN*, Commander in Chief, U. S. Fleet, and Chief of Naval Operations, 23 April 1944.

IN February 1942, the President established an agency known as the U. S. Chiefs of Staff (frequently called the "Joint Chiefs of Staff") whose function it is to exercise strategic control of our armed forces in the war. The members of the U. S. Chiefs of Staff are the Chief of Staff to the Commander in Chief of the United States Army and Navy; the Chief of Staff of the United States Army; the Commander in Chief, United States Fleet and Chief of Naval Operations; and the Commanding General, Army Air Forces.

By effective coordination of strategic plans and their execution, the U. S. Chiefs of Staff have in effect operated the Army and Navy as one national military force. Furthermore, by continuous exchange of information of all kinds, including that relating to operating techniques, new weapons, and strategic and tactical problems, the two services have been able to derive the maximum benefit not only from each other, but from all other agencies whose activities have a direct bearing on the conduct of the war.

In keeping with the unity of action taken by the U. S. Chiefs of Staff, that agency has worked out and established certain principles relating to unity of command in joint operations. Under those principles, and having due regard for the qualifications of the officer and the type of operations likely to predominate in a given theater, the supreme commander in the theater, and his principal subordinates, may be officers of any one of the services. For example, it was agreed that under certain conditions unity of command in our sea frontiers (which correspond generally to Army defense commands) would be exercised by Naval officers. Under other conditions, unity of command would be vested in Army officers. Another example was the unity of command vested in General Eisenhower in the North African operation. Still another is the unity of command exercised by Admiral Nimitz in the Pacific Ocean.

The principle of unity of command as it exists within our own forces, by agreement with the British Chiefs of Staff, is extended to situations where forces of more than one nation are engaged in the same operation. The operations in the Mediterranean theater illustrate that arrangement, which has worked well.

Specialization in Aircraft Maintenance

LIEUTENANT COLONEL CHARLES P. SHEFFIELD, *Air Corps*
Instructor, Command and General Staff School

NOT new to the Army Air Force, but receiving new and serious emphasis in recent months, is the principle of *production line maintenance*. The *complexity* of the mechanical details of our modern airplane is forcing our mechanics to become specialists. The day of the old crew chief who could do everything that needed to be done to maintain an airplane is over as definitely as the day of the housewife who considered it SOP to sheer the sheep and spin the wool in order to clothe her family. The pressure of time makes it impossible for one man to keep up to date on all phases of equipment and maintenance technique. When he has learned all about propellers he is more valuable and more skilful if he keeps busy working on propellers than if he is obliged to learn about generators, superchargers, and hydraulic systems as well.

Every trade, industry, or profession has begun in its infancy with the all-around worker and has grown to having its specialists. The era when a cathedral's slow construction was accomplished by generations of workmen who devoted their entire lives to that one cathedral is supplanted by the era when a workman contributes his skill to the completion of the Chrysler Building in one year and to the Empire State Building in another. In the early days of the motor car industry, each workman performed many jobs on each machine. He not only worked on the motor, but he also adjusted the gas headlamps, polished the brass coils of the horn, and buckled down the straps which secured the hand crank. A plant thus proudly turned out as many as fifteen cars per day. When the industry grew up, the system changed. One workman applied a nut, another tightened it, and another inspected it. Thus a plant turned out 1,500 cars per day, keeping pace with the pressure of time and demand. In the early days before specialization, the family doctor's worries of a single day could range from appendectomy to apoplexy, from colic to concussion. The medical profession has now grown up to specialization. Time does not permit one man to keep informed on all phases of the human mechanism—so we have the orthodontist, the pediatrician, the obstetrician, the surgeon, and the epidemiologist—each able to work skilfully on his own appointed territory of human anatomy. Medicine, too, has grown up to production line maintenance.

To call attention to the growth of specialization to meet the demands of the modern world is trite, but the fact remains that, while specialization is accepted generally as essential to progress, in organization for maintenance of an airplane we still cherish the idea of the non-specialist. The airplane maintenance crew has long been the standard organization for maintenance in groups and squadrons. Much can be said for it. Such organization lends itself to the development of a competitive spirit in maintenance. Each crew wants its airplane to be better kept than any other airplane on the line. A personal loyalty to that airplane is built up in each crew member. The pilot and the crew are a working team, each depending on the other. The crew knows its plane well—is familiar with each individual quirk. We like to keep alive the personal feeling for "*his*" plane in each member of both the combat crew and the maintenance crew. By assigning a maintenance crew to an airplane, a sense of responsibility and possessiveness is brought about more effectively, it is felt, than by an organization wherein a mechanic works on any airplane that comes along. The movies have glorified the anxiety of the ground crew for its own airplane. You will remember in *Airforce* how well depicted was the crew frantically working against time to bring its own "Mary Ann" back to fighting trim—accomplishing the miracle, too, because of the feeling of the crew that its own airplane must always be the best on the line. Such spirit is wonderful, but is it not very remotely like the pride of the workman who could pat each horseless carriage on the hub-cap and

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say "I built this machine!" or the family doctor who could pat his patient fondly on the head and say "I not only brought you into the world, but I also carried you safely through mumps and measles and through angina and arthritis!"

Our great need today is to keep our airplanes in the air as many hours per week or per month as possible. Standardization of equipment and of maintenance procedures would seem to be the answer. Fortunately, today our airplane manufacturers are standardizing to a large extent on airplane models and accessories. This permits an electrical specialist to feel at home on almost any airplane he works on. A hydraulic specialist can be used to greatest advantage working on several different planes instead of being assigned to a crew where he works on only one. This is particularly applicable on a base where only one type of airplane is being operated, such as, for example, many of our training bases where we now have only Heavy Bombardment—perhaps only B-17's or B-24's.

It has been found by commercial air lines and in army training centers and staging areas where airplanes come and go in large numbers that certain types of work can be more efficiently handled by having specialists do the same type of work over and over again on different planes. A good example is the making of an engine change. A crew chief and his crew, if working on one airplane, would be called upon to make an engine change once every three or four months. From one such operation to another, the members of the crew will have forgotten, or will not have had the opportunity to develop, the little labor short-cuts and the use of handy devices. Each engine change becomes a new problem, whereas a crew set up to operate as an engine-change crew and allowed to operate day after day changing engines on the same model airplane becomes very efficient and develops new improved methods and tools for its work.

Practice of commercial airlines has demonstrated the efficacy of production line maintenance. With their operations set up on a definite schedule, they are able to compute weeks ahead of time the approximate amount of maintenance that will be required. Their airplanes, although flying all over the country, can be so routed that all of their major maintenance can be performed at one or two stations. At these central locations are concentrated maintenance equipment, specialized tools, and highly skilled personnel. One airplane is the same as any other in that the system is set up to work on any airplane that is routed into the shops for repair work. The maintenance planning section works out schedules with its operations section so that at certain operating time intervals the planes will be at certain places where maintenance is to be done. The operations plan is so designed that as soon as one airplane is finished and out of the way, another airplane rolls in to be worked on. Actually, the airlines have piled up a commendable record in aircraft maintenance. During the first half of 1943, one of our leading airlines averaged more than 350 flying hours per airplane per month. Complete double engine changes are regularly made in sixteen hours or less from the time the airplane flies in until it flies out again on another trip. Efficient maintenance systems can claim a large share of the credit.

Maintenance with the Army Air Forces will perhaps never be up to the standard in terms of plane flying hours per month because of the far more complicated maintenance requirements inherently existent on combat type aircraft and because of the lack of the exact sort of schedules followed by the commercial airlines, but the record demonstrates what the line system can accomplish.

Now all of our squadrons are set up with especially trained men. We have propeller specialists, electrical specialists, etc. The bulk of the maintenance personnel is usually put into maintenance crews and assigned to specific airplanes. A production line system would better utilize these mechanics by organizing them into crews, not by airplane, but by type of duty. Then every airplane of the unit that received a 100-hour inspection would have been inspected by the same crew. Every engine changed would have been

changed by the engine-change crew! Obviously, we cannot do without the crew chief, however, when the airplane is actively engaged in flying operations. Someone must be responsible for servicing and for routine inspections. We can think of the crew chief as caretaker or supervisor of the airplane. With very few assistants he will see that his airplane is refueled and that preflight and daily inspections are performed. He will probably perform the 25-hour inspection. From then on he will merely see to it that his plane is put in line for the production line maintenance boys to do the 50-hour, 100-hour, and other inspections. He will be relieved of the necessity of being a specialist on every system of the airplane. He must be able only to detect defects and malfunctions so that he may call on a specialist. For example, he will detect at once that something is wrong with the propeller when an engine designed for take-off at 2600 RPM turns up to 2700. He calls in the propeller specialist to make the proper adjustment. Or something may be wrong with the electrical system. The pilot reports a generator out of commission. The crew chief has only to consult the electrical specialist who makes a check. The electrical man interprets the pilot's statement according to his own knowledge. From the pilot's statement he knows that the pilot's ammeter was showing no charge for the generator. The trouble may or may not be the generator itself. It might be the ammeter. It might be faulty wiring or broken or disconnected terminals. At any rate, the electrical specialist who does nothing day after day but work on electrical systems applies to this situation the trouble-shooting technique he has studied in school and learned through intensive experience. He accepts the responsibility for its correction. The crew chief depends on the electrical specialist to do this. Obviously, it is unlikely that every crew chief could be expected to possess the necessary knowledge to take care of all the things that can go wrong with the many complicated systems of a modern airplane.

Some critics of specialization have pointed out the sacrifices we make in flexibility. The old adage that a chain is only as strong as its weakest link is applicable to a maintenance system where several specialists are dependent one upon the other for the final condition of the plane. And at times full appreciation of the troubles of the sheet metal worker is not forthcoming from the engine-change crew, or the welder fails to understand the problems of the hydraulics man. Field maintenance is characterized by local modification and improvisation. In the grinding dust and sand of the North African desert, mechanics realized that something had to be done to give some measure of protection to their airplane engines. A carburetor air filter was devised from cheesecloth and bits of scrap metal available on the spot. A year later the laboratories at home were still struggling to perfect an air cleaner. Would this type of initiative and ingenuity suffer under production line maintenance?

With proper coordination between sections and between specialists, the same or better ability to meet unforeseen difficulties should exist when the mechanics are assigned to maintenance sections as when they are assigned to airplane maintenance crews. Emphasis belongs on keeping the maximum number of planes flying. Our loyalty is given not to one plane or one squadron of planes, but to keeping all of them flying better and more effectively and for more hours per day or month or year. As the airplanes leave the runway, the ground crew can say, not "There goes our plane!" but "There goes our armada!"

Don't let your SOP degenerate into a sop.
One definition of sop: anything that takes up by absorption.

—Anonymous.

Native Labor in the Southwest Pacific

LIEUTENANT COLONEL DUNCAN SINCLAIR, *Field Artillery*
Instructor, Command and General Staff School

WITH the start of the war in the Southwest Pacific, most of the missionaries, planters, and resident managers were evacuated as the Jap advanced from island to island. When the United Nations forces came to grips in New Guinea, it was necessary to have men who could effectively organize the natives and put them to military use. This was done by recruiting volunteers from the ranks of the resident managers, who were organized originally as the New Guinea Volunteer Rifles. Early in 1942, the name was changed to Australian New Guinea Administrative Unit, popularly known as ANGAU (an'gow, as in "how"). The ANGAU has done a superb job in accomplishing its mission, and all matters relative to the control and supervision of the natives is left in the hands of the members of this unit. They are all Australians who have put in a number of years in the islands. They understand the native, they talk his language, and can answer any questions regarding the capabilities and limitations of the native. They organize the labor gangs, recruit the natives, assign them to tasks, supervise the work, and pay the native for his work. It is only necessary to tell ANGAU what to do, and ANGAU does it.

The existence of ANGAU does not relieve a staff officer—or any military personnel—from the necessity of understanding the native. There have been several task forces organized to make amphibious operations which landed on shores where the natives were not organized. In most cases a few ANGAU personnel went along—in the capacity of special staff officers—to advise and assist, but it was necessary for other officers to understand the problem. Particularly has education seemed necessary for air men and sailors who have been forced to make landings in strange or enemy territory.

The typical New Guinea native is about five feet tall, averages 112 pounds, and is inclined to be skinny and pot-bellied. Taken as a whole, he is friendly to the white man, cheerful, willing, and considerably smarter and more intelligent than his appearance indicates. Largely as a result of the work of missionaries and the capable and fair administration by the Australian government, the native has come to respect the white man and to expect just treatment from him. From his dealings with white men who know him and his nature, the native expects the white man to be shrewd in bargaining and to catch him whenever he attempts to lie or steal. His physical development permits him to carry a load of thirty-five or forty pounds for six or seven hours per day. He is agile and works rapidly when engaged on tasks with which he is familiar. A load which one native can carry for short hauls may require three other natives to lift to the first one's shoulders. The native is completely at home in the jungle and will suddenly disappear if he is not promptly paid or if he is maltreated. Except for jungle diseases with which most are ridden, the native is quite healthy. He has faith in the white man's medicine, and will readily report for and receive medical treatment when he knows it is available.

The natives live together in villages, one or more of which may be peopled by the same tribe. Customs and attitudes vary from one tribe to another. The best that can be said about customs is to interfere with them as little as possible. For example, the native attaches a great deal of importance to the betel nut palm, for he is addicted to chewing the betel nut. Since the tree doesn't bear until it is twenty years old, all betel nut palms are carefully watched and tended. Consequently, the native is considerably upset when he sees a bulldozer uproot such a tree—even if military necessity dictates. As often as not, this can be avoided, and such consideration pays dividends. As for attitude, the degree of friendship of the different tribes varies, depending upon the amount of contact with the white man and the treatment which has been received. But by and large the natives can be counted on for a friendly re-

ception. They have come to "feel we belong, whereas the Japanese are in every respect strangers. Natives don't like strangers. Therefore their natural inclination is to side with us."

A consideration of how the native can help will convince anyone of the value and need of the native. Probably his biggest use has been in the movement of supplies, ammunition, and food to the front, and in the evacuation of sick and wounded to the rear. Natives did a great deal of this in the Buna campaign, and before Salamaua in country where neither jeeps nor pack horses were capable of employment. These were two places where native carriers, organized and supervised by ANGAU, really saved the day. Certain capabilities and limitations of the native carrier, from a booklet, "The Native Carrier," published by the Allied Geographical Section, SWPA, will be of interest to officers in G-4 sections. As has been said before, the average native can carry from thirty-five to forty pounds for six or seven hours a day. Either he will carry this individual load on his back, or the load may be doubled, slung from a pole, and carried by two natives. The length of a day's march depends strictly on the nature of the terrain. Over bad mountains five miles is a good march, while fifteen miles is a fair expectation over flat country. Rates of march, too, depend on the country, and may vary from half a mile to two and a half miles per hour. Long treks are usually made by stages, each of which is a temporary camp one day's march from the next—or last—stage. Supplies are hauled to each stage by one group of natives, where they are dropped to be picked up and moved on to the next stage by another group of natives. The first group will then return *empty* to pick up another load. In other words, the native carries in one direction only. Back-loading—or carrying on the return trip—is not considered cricket by the native. Laugh as you will, but if you attempt to back-load a group of natives, they will soon disappear into the bush and you will have no natives. A vital point to be considered is that the native must carry not only the supplies to be delivered to the front, but also his *own* food *plus* food for the natives at the advanced stages. As an example, consider rice only, to the exclusion of other components of the native's ration. The daily ration is one and a half pounds per native. A native carrying a normal load can carry approximately twenty-four days' supply of rice, or enough rice to feed twenty-four natives for one day. In any group of carriers, one native will be needed for each twenty-four carriers in the group, plus each twenty-four carriers operating from advanced stages.

The amount of supplies which can be moved by native carriers depends, of course, on the number of carriers available. Neither their speed nor their capacity can be increased. Consequently, if supply is limited to carrier-transport, the number of carriers available is all-important.

The various pamphlets which have been prepared by General MacArthur's headquarters have been very helpful in teaching military personnel how to enlist the help and cooperation of the native. As one of these pamphlets states, "The natives are a very important factor in the military situation. Their goodwill may decide whether we win or lose the battle of New Guinea. . . . We are lucky to start with this advantage. (It would certainly take a very long time to win without it.) It is our business now to use the advantage properly and see that we keep it. Remember that with improper use it is always possible to lose it."

To attempt to spread out over the terrain so as to be uniformly strong, is to be weak everywhere. Every attack should have its main effort, and so should every attacking unit.

—Infantry in Battle

Combat Importance of Night Vision Training

MAJOR LEE O. ROSTENBERG, *Field Artillery*

WITH much of modern warfare waged at night, and operations usually under total black-out conditions, inefficiency and at times disaster can and do result when soldiers who are night blind or who have poor night vision are trained and employed for duties where good or superior night vision is essential. Conversely, troops thoroughly trained in night vision and night combat, as are the Japanese, the Russians, and British Commandos, have accomplished night missions we still consider excessively difficult or impossible. Observers and others in and from combat zones have reported repeatedly and definitely that it is most necessary that proper attention be given to this very important subject of night vision.

The night attack has been employed for surprise throughout the centuries; one of the earliest recorded being the night action of Moreh, about 1250 BC, in which Gideon, leader of the Israelites, won a great victory over the Midianites. By ruse and surprise, Gideon threw the Midianites into great panic, whereby they fought among themselves in the dark. It was during the ensuing rout and brilliant pursuit that the Israelites slew most of the foe. Gideon prepared for this action with the greatest attention to detail. His men were hand-picked, specially trained, and well disciplined. He made a personal reconnaissance. These principles are as important today as they were thousands of years ago.

Up to modern times, however, use of the night attack has been greatly the exception rather than the rule. The first really important resort to night attacks developed in the Russo-Japanese War. Here, for the first time, a growing tendency was evinced by both combatants to employ forces of considerable strength in their execution of night attacks. Although a very few clear-thinking military observers grasped the significance of the trend and assumed that in future wars similar circumstances would compel adoption of similar methods, apparently only the Japanese did something about it. Not only did they make a detailed study of night movements and night operations but also adopted minute and painstaking training for night combat. The importance of training the vision at night was greatly emphasized. Hence, Japanese superiority at night is the result of thorough training and indoctrination of many years.

Even the Russians, who in this war employ night operations with great success, apparently for a long while had forgotten the lessons of their own war with the Japanese. For in World War I and in the Russo-Finnish War of 1940, they showed little if any ability in night operations. Indeed, it was only after the Russo-Finnish War of 1940 that the lessons of the Russo-Japanese War were reaffirmed and developed to the high point now shown in their current war with the Germans. It has been stated recently by the Russians that, although the Germans have begun to engage in night attacks and counterattacks more frequently, they as a whole still stand in greatest fear of Russian activities at night. This the Russians consider to be one of the weak spots of the Germans. It is one we should likewise exploit. Yet reports from the Italian theater indicate that our night combat activities have been restricted mainly to World War I type night patrol actions.

The tactical advantages and disadvantages of night operations are stated generally in our Field Service Regulations, which as now written are not very encouraging for the large-scale night attacks which the Russians and Japanese have demonstrated to be practical and nearly always successful when properly conceived, thoroughly and carefully prepared, and executed with disciplined troops fully trained in night vision and night combat. We tend to underestimate our capabilities for large-scale night actions. For example, the Russians maintain that tanks are quite adapted for combat work at night and play a great role in night actions. We

still hold that their role is very limited. The Soviet Army carries out night warfare by special units which replace troops who have been attacking by day.

It is essential to carry out night pursuit, since both the Germans and the Japanese often make use of the night for retirement. If our soldiers are properly selected for their night vision, thoroughly trained in the use of their eyes at night, equipped with proper equipment, and otherwise trained in night fighting, they should be able to accomplish everything, and possibly more, that the Russians and Japanese have demonstrated feasible.

Even before our entry into the war, our observers on many fronts reported the importance of night vision and cited instances of disaster and near disaster ascribable only to defective night vision or lack of night vision training. The British found, prior to retirement from France, that personnel ordinarily very acute in observation during daylight became poor observers at night. When they investigated, it was decided that it was a problem of night vision. They accordingly have modified their observation instruments, set up special training standards, and have attempted to preselect personnel for night duties on a basis of their night vision abilities. The British also had a most bitter lesson in the Malayan campaign and the loss of Singapore. It was here that the Japanese showed themselves to be masters of night movements and other night operations, and their success in this campaign, and in others, was in large measure due to this predominant skill.

It was reported that in our African landings numerous of our troops were drowned or nearly drowned either because they could not see in the dark or were not properly trained for the landing operations in the dark. In the advance on Beja in December 1942, a battalion of U. S. heavy artillery met with near disaster due to the night blindness of a single officer. The advance was made by night march on a very dark night. Coming to a road junction, no marking was found although an officer had gone ahead to mark the route. As a result, a wrong turn was taken, and after several hours further march, the road terminated in a blind end. By good fortune, there was enough room to turn around the heavy equipment of the battalion for the march back to get on to the right road. In that country, it could easily have been otherwise. It was learned upon investigation that the officer in charge of marking the route was night-blind and simply did not see the side road in the dark to mark it.

In a recent journal article,* a naval officer stated, "Night blindness is a . . . problem . . . of military import because persons suffering from this condition may have perfectly normal vision during the day and be useless as observers after the sun has gone down. . . . On a number of occasions tragic collisions have resulted because the navigation officer on the bridge was night blind, while he could see perfectly well during the daytime. . . . " The Navy, particularly in the Submarine Service, devotes many hours to testing and instruction of lookout personnel for their night vision. It has done, and is continuing, excellent research on this vital subject, as is the Army Air Force. It is obvious to them that the side which sees the enemy first has best chances of survival.

Although night blindness was known to the ancient Egyptians and reported in all major wars since the Crusades, particularly World War I, the problem of night vision was considered until recently purely a medical one and not military. Today, night vision must be considered most emphatically a military problem.

Many otherwise competent officers and men do not realize that night vision is entirely different and separate from day vision. A person who may see excellently in the daytime may see poorly at night, and conversely. The factors involved in night vision are highly complex and in no instance is the performance of the eyes at night dependent solely upon the illumination or any other single factor. Night vision itself is not a

*"Tropical Neuropsychiatry," by Lieutenant Commander James L. McCartney (MC), USNR, in *War Medicine*, April 1943.

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simple unit of performance or ability but may be considered a combination of innate aptitude and training. It is greatly influenced by mental and physical factors. Therefore, training for night combat must take into consideration the problems of night vision.

Also, too many of our officers still think of night operations only in terms of bright moonlight and starlight conditions. This is seriously in error. The British have found it possible and highly profitable to take off and land planes and conduct land and amphibious operations under virtually pitch-black conditions. Most of our commanders still consider this impossible, although the successful Anzio landing was made in the "dark of the moon." The bridge between impossibility and possibility is proper night vision training and aids.

It may be noted that in the Southwest Pacific, amphibious operations are nearly always launched under cover of early morning darkness with the actual landings made at dawn. However, the rule there for land warfare is, when night falls, for our soldiers to dig in and remain in their foxholes and to shoot at "anything that moves" until dawn. This encourages an enemy to use infiltration tactics and thereby keeps our troops awake and in a turmoil all night, leaving them exhausted the next day.

Recently there have appeared in the MILITARY REVIEW some excellent articles, discussions, and translations pertaining to night combat and night operations.* These articles are cited not only to indicate present thought, but for the excellent material therein contained. However, none treated the vital factors of night vision, preselection of personnel and training, or gave instructional material concerning them. Because proper night combat training can not ignore night vision, some of its principles and factors will be discussed herein.

The backbone of success in night warfare is the thorough, painstaking training in detail of the individual and the small unit, after careful preselection has been made of the personnel picked for such training. Even more important than the training of the individual soldier is the training of the officer who is to lead him.

While it is characteristic of night fighting that every individual soldier has a great importance, far more than by day, failure or success of an operation may depend upon just a few key men. Therefore, the night vision ability and training of these few men can determine the success or failure of large operations. However, all men not suffering from defective night vision, defective hearing, or emotional instability should be trained for efficient night combat.

Individual differences among soldiers in their ability to see at night are far greater than has been suspected. By very recent tests in the field actually measuring the performances of troops to see in the dark, using actual military objects as targets, the writer has found that even on dark starlit nights, the superior soldiers (highest ten percent) of a highly trained paratroop battalion saw as much as 9.4 times farther than the poorest (lowest ten percent), and the poorest could see only one-fifth the average distance for the entire group. This is illustrated graphically in Figure 1. That such great individual differences exist is considered a fact of great military importance.

There is not only the matter of night vision ability of the man himself, but the judgment and confidence developed by experience. There is no substitute for actual training in the field at night. It must be remembered, too, that most of our soldiers up to the time of their induction have spent their lives in large towns or cities and have rarely been beyond the range of artificial illumination. Such

*"Night Combat," a translation of an article by Lieutenant van Muyden in *Review Militaire Suisse*. February 1942-July 1942 issue.

"The Future of Night Attack," by Colonel H. E. Kelly, Infantry. October 1942 issue.

"Night Operations," by Major Collins-Powell, Military College, Curragh, Eire. (Reprinted from *An Cosantoir* May-June 1942). January 1943 issue.

"This Is a Night War," by Colonel William L. Roberts, Infantry. December 1943 issue.

"Night Operations," translated from a Russian article in *Krasnaya Zvezda* 17 April 1943. December 1943 issue.

"Pursuit," translated from a Russian article by Colonel G. Andriyuk, Soviet Army, in *Krasnaya Zvezda* 11 August 1943. March 1944 issue.

men, when first taken out into the dark alone, are helpless and confused. Even on level ground they stumble around, are noisy, and become, if lost, generally so excited they are irresponsible for their actions. These same men, properly instructed, can be trained to work together on the darkest night. Once they have gained confidence, the rest of their instruction is comparatively easy.

This confidence is in large part attained by "culling-out" initially those with poor night vision, selecting those with superior night vision for key assignments, and giving all full and proper night vision training. Training definitely improves night vision.

Until very recently, no night vision test was available to the Army that would efficiently classify soldiers in the field as to their relative abilities to see in the dark. Outdoor tests for classification of personnel as to their night vision abilities are generally highly unreliable because night illuminations vary greatly and there are many other uncontrollable and distracting factors.

The Army Air Forces very early realized the importance of night vision preselection and training, and have done outstanding research in this and allied fields. They developed and now employ an excellent apparatus built for mass-testing and classifying personnel for their night vision abilities. Since it is essentially a laboratory instrument, expensive and intricate, it is hardly useful for the millions of troops who are now in the field.

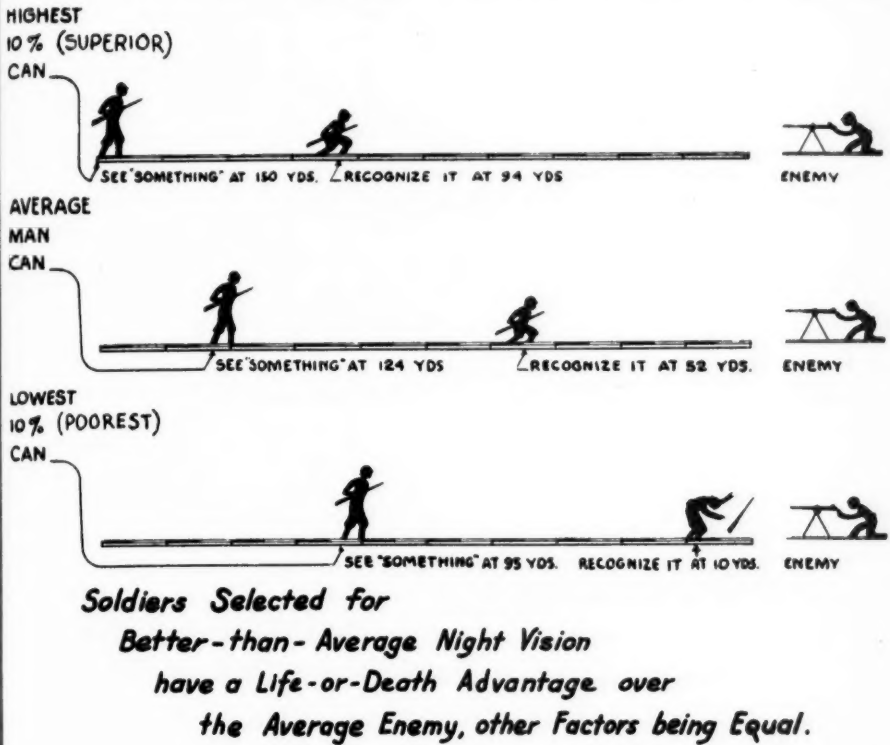

FIGURE 1.

DIFFERENCES BETWEEN SOLDIERS IN ABILITY TO SEE AT NIGHT.

The Navy has developed a fairly simple device for individual testing, and which they use to "weed out" those with poorest night vision.

In a study of night vision recently concluded by the writer, a simple mass night vision tester was devised that can be built with the tools and resources available to the average field unit. It will classify individuals from superior to poor according to their night vision abilities. Tests in the field and other procedures have indicated this device to have high reliability and validity. It will permit testing of large numbers of troops in a short time under standard conditions and with minimum personnel for administration. Early availability of this or a similar test device to units in the field should greatly facilitate preselection and training of troops for their night vision.

Night vision training should embody the following essentials:

1. Selection of personnel for night operational duties on the basis of their night vision ability—assigning men with superior night vision to vital night duties, poorest to least important.

2. Education in the principles and factors involved, particularly "off-center" vision, scanning, proper pre-adaptation, avoidance of factors interfering with night vision, and use of aids to good night vision.

3. Thorough indoctrination of all personnel in the vital need for good night vision.

4. Constant training in normal night duties in the field under black-out conditions.

Importance of Indoctrination.—Initial orientation and indoctrination should be so thorough that soldiers will realize that efficient night vision may not only save their own lives, but might mean the margin of success or failure of their own units in battle. Many examples are available of the high combat value of good night vision. These should be cited frequently. It has been found that the principles of night vision are grasped easily by most individuals. Because they are so different from normal daytime vision, however, there is great tendency to forget them under stress in the field. This can be overcome by constant, conscientious practice.

The Off-Center Vision Principle.—The eyes have two sets of light detector cells, the *cones* which see bright lights, and the *rods* which see at night. The cones are packed into the very center (fovea) of the retina of the eye,

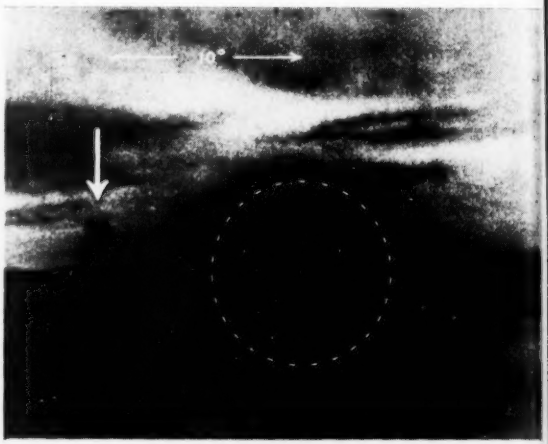

FIGURE 2.

and therefore in daytime one looks directly at objects to see them best. No rods exist in the fovea but are located all around it. Thus, in darkness, the fovea is actually blind, and only the "off-center" regions can see. Hence, in order to observe an object at night, one must look off-center. The importance of this principle is illustrated in Figures 2 and 3. In Figure 2, to see the target (indicated by white arrow) at night, the blind daytime center of vision must be directed from six to ten degrees off-center. If one looks directly at the target (Figure 3), it no longer can be seen.

Scanning.—There is a rapid decrease in sensitivity of the rods when the eye is held fixed on an object. Observers must be taught

to scan systematically. This consists of short, jerky movements and short pauses across the field being searched. Actually little or nothing is seen while the eye is in motion, but the rods are most sensitive at the moment movement ceases. The observer should never stare.

Importance of Dark Adaptation.—Dark adaptation is the slow process normally taking at least a half hour for the eyes to adjust from daytime levels of illumination to full darkness. Without allowing an adequate period to dark adapt, a soldier is virtually

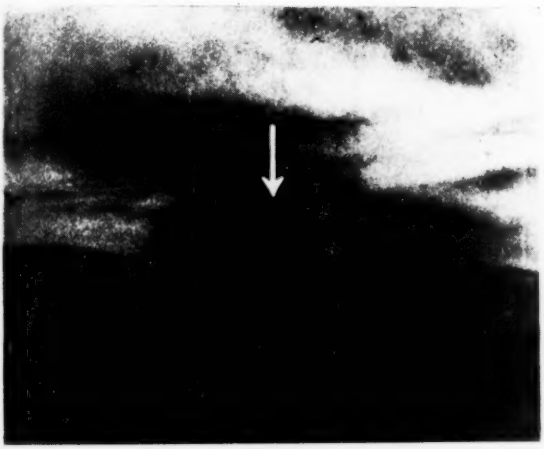

FIGURE 3.

blind in the dark and can not protect himself or properly function in duties requiring night vision. The eyes may be usefully employed during the first twenty minutes by either (1) remaining in a very dimly lit room, or preferably, (2) wearing special pre-adaptation goggles with deep red lenses. The last ten minutes must be in total darkness. Only momentary exposure to light will instantly damage dark adaptation. It is therefore extremely important for soldiers to (1) use deep red lights of minimum intensity when reading instruments or scales, and then looking for only the briefest instant, (2) avoid looking at any flashes or glares, (3) when absolutely necessary to expose to light, thoroughly cover one eye until the light is gone. Each eye is independent of the other, and therefore the covered eye will remain dark adapted. Troops should be thoroughly trained in their night duties so that they can be performed efficiently without any lights.

Contrast.—Training should emphasize that every effort should be made to utilize the maximum degree of contrast. Scratches, dust, and dirt on windshields, instrument lenses, goggles, etc., which may be wholly unnoticed in daytime, greatly reduce visibility at night. All glass surfaces used to observe through at night should be kept scrupulously clean.

Outdoor Training at Night.—An excellent method of training military personnel to recognize military objects in the dark, such as vehicles, weapons, and men is to show them these objects under conditions approximating those of night combat. Darkness not only makes it difficult to see objects; it greatly changes their appearance and apparent size, and details can not be seen. (See paragraph 14 of FM 21-75.) Men should be instructed especially on objects that are commonly misidentified at night. Much night vision training can be integrated with other tactical and technical night training. Maximum use must be made of the auxiliary senses of sound, smell, and touch. (Paragraphs 15, 16, 17, FM 21-75.) Competition in night vision training is definitely helpful.

Training Aids.—A number of special training films exist concerning night vision and these should be utilized wherever possible in a training program. As and when made available, film strips and charts should be employed extensively. Excellent instructional material also may be found in Chapter III, *Psychology for the Fighting Man*, available to all units.

There are numerous other factors in night vision which can not be discussed because of space restrictions. However, a great need

exists for binoculars and optical fire control instruments designed especially for night warfare. We have certain other technical superiorities over the enemy that should be exploited to the fullest extent possible.

As Colonel William L. Roberts has said in "This Is a Night War" (MILITARY REVIEW, December 1943), "Fighting and moving at night are so important that a unit unpracticed in these should be labeled unsatisfactory for combat. Many of our combat officers are still ignorant of the principles and methods of planning and conducting night operations both large and small." An even larger number are ignorant of the principles, methods, and means for proper training in night operations.

With soldiers properly preselected for their night vision, thoroughly trained in use of their eyes at night and in night combat, fully understanding the factors affecting night vision, and given proper equipment, night actions now considered dangerous or impossible will be successfully accomplished. It seems highly important, therefore, that we should establish without delay systematic, detailed, thorough methods of preselection and training of our Army for night vision and night fighting.

Keep Bearings Wrapped

BEARINGS are still among "the chosen few" at the top of the list of critical items used by the Army. Therefore, constant attention to maintenance practices in the use and handling of bearings is one of the important duties of Army personnel whose responsibilities involve operation and maintenance of mechanical equipment on which they are used. And no less important than their proper use in service is their handling before installation.

A common failing in this phase of operation is the tendency to take bearings out of the wrappers before they are ready for installation, or to fail to wrap them when they are being stored.

An unwrapped bearing is like a soldier without a foxhole. It hasn't got a chance against its mortal enemies—sand, grit, rust, and breakage. For it only takes a couple of grains of sand to score a bearing and turn it into a piece of scrap. A bearing stored in a bin without wrapping is subject to a constant shower of particles of sand and grit sifting down from items thrown in on top of it. A bearing placed on the running board of a vehicle or on a dirty workbench can pick up enough grit in one instant to ruin it in short order. Moisture from the hands will cause rusting as surely as if the bearing were dipped in a pail of water, when there is no protective wrapping.

There are, of course, numerous other danger points in handling bearings which are equally vital. They must always be properly cleaned and lubricated, and in this regard it is essential that dry-cleaning solvents and lubricants be *clean*. Lubricant containers, therefore, should be kept covered as much as possible, to prevent dust and grit from settling and blowing into them. Hands, benches, rags, tools—everything that touches the bearing—must be kept *clean*.

Lubricant Orders and instructions in technical manuals must be followed to the letter, so that bearings are installed and lubricated properly.

Bearings are scarce—they *must* be protected. And the wrapping is one of the most important forms of protection. A bearing that is unwrapped for any reason should be wrapped again before storing. A bearing should never be issued unwrapped. Anyone who receives an unwrapped bearing should wrap it before storing. Bearings must be kept wrapped *at all times*—right up until the time they are installed. (Maintenance Division, Army Service Forces.)

Let's Emulate the Champ
A Plea for Accompanying Artillery

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THERE is an old adage among gamblers that in case of doubt always bet on the champion rather than the challenger. This applies to war as well as to sport, although it is more difficult in the military game to determine who the current champ is.

When the Germans were winning in 1940, they were undoubtedly the current champs. It was the part of wisdom to ape their organization and tactics; it was smart to study their methods and emulate their techniques. But times have changed, and in the ebb and flow of events since 1940 a new champ has emerged—Russia. The old champ has been beaten, and it is only wise that we—the hopeful contenders for the belt—should study the methods of the new champ—our Russian ally—with the hope of thereby increasing our skill in the he-man sport of war.

Our Russian brothers are cagey fellows. Their winning techniques are not broadcast to the world. Exact information is not available. Such as is available is somewhat old and somewhat conflicting, but at least this much has emerged—their use of artillery is superb. The Russians seem to give much of the credit for their victories to their artillery. It behooves us, therefore, to study their employment of artillery, and since it pays to play the champ it will doubtless pay us to emulate their artillery techniques. Of course we think our artillery is good. On the basis of the preliminary bouts in which we have engaged, perhaps it is. On the other hand, our success in the small sparring matches with the old champion has not been so outstanding as to warrant complacency on our part.

The Russians started the war with two regiments of artillery with each division and practically none in the higher echelons. This organization did not work well and was soon changed. The change consisted essentially in taking one of the two artillery regiments away from each infantry division, and organizing them into artillery divisions corresponding to our artillery brigades. Many additional heavy and medium caliber units were organized and included in these artillery divisions. These artillery divisions were (and are) habitually centralized under army control.

How does this compare with our organization? Since the corps echelon does not exist in the Russian army, the bulk of Russian artillery is centralized under the unit next higher than the division, i.e., the army. The bulk of our artillery is also centralized under the unit next higher than the division, i.e., the corps. There is thus no essential difference in this respect. The use of sound and flash units, survey, massing of fires, etc., appears analogous to our own methods. This is encouraging—it pays to be in step with the champ.

In one important aspect, however, we are not in step. *The Russians have one whole echelon of artillery which is missing in our army—accompanying artillery.* Perhaps this statement is too broad. Accompanying artillery is embryonic in our army as the infantry cannon company. Also—quite recently—the use of tanks in such a role has been advocated. But on the whole, we have not remotely approached the Russian concept in the use of accompanying artillery supporting infantry by direct fire. *It pays to emulate the champ.*

The cannon company is at present neither strong enough nor properly equipped to carry out the accompanying gun mission. The real inspiration—the true ancestor—of our cannon company is the German infantry regimental howitzer company. The German version consisting of six 75-mm and two 150-mm short-range, horse-drawn weapons has the mission of furnishing artillery support, usually by *indirect* fire, when the organic division artillery is being used elsewhere. The tendency of our infantry regimental commanders is to follow the German

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concept and use the cannon company as indirect field artillery rather than as direct fire accompanying artillery.

Attached tank units are well suited for the accompanying gun role except for two drawbacks. In the first place, tank commanders seldom accept the role as worthy of their efforts. They say, "Our mission is to close with and destroy the enemy. Use us in mass. Make a hole for us and then let us lead. *You support us.*" The more important reason for our failure to train properly for the use of tanks as accompanying artillery is our stubborn insistence on the pooling principle. It is naïve to expect that tanks can be kept as a unit back in corps or army reserve, then attached just prior to an attack, and then work closely with the supported infantry. We have learned that we cannot produce an infantry combat team overnight by teaming a new direct support artillery battalion with an infantry regiment; we have learned that they must be trained together from the beginning. Likewise a given tank unit must be trained with a given infantry unit until the respective commanders know each other personally. Our tank-infantry teams must be put on the same basis as our direct support artillery battalion-infantry regiment combat teams. This is not accomplished overnight.

Our present medium tank is not ideally suited for use as an accompanying gun in support of infantry; it is too heavy and consequently too sensitive to terrain. Neither the orthodox towed 105-mm M2 nor the light sawed-off version, M3, are well suited to the mission, for obvious reasons. The 105-mm self-propelled howitzer is too susceptible to machine-gun fire. The 75-mm assault howitzer doesn't have enough punch for the job. What we really need is an armored self-propelled gun of about 75-mm or 105-mm caliber weighing not over ten tons. The armor should be only thick enough to stop .50-caliber armor-piercing projectiles at 200 or 300 yards. Since our infantry is going to meet plenty of concrete fortifications on any future battlefield, the weapon should be powerful enough to cope with ordinary concrete emplacements. The tank destroyer, M18, is probably the nearest approach to what we need, although it is heavier than is desirable.

This accompanying gun should have the primary mission of supporting infantry by direct fire. These accompanying guns might well be organized into platoons of five weapons each, into companies of three platoons each, and into battalions of three companies each. One such battalion should be organic in each infantry regiment and the present cannon company eliminated. The battalion should be primarily an administrative and maintenance unit; these weapons are fought by attaching companies to infantry battalions—and *always* the same company to the same battalion. Within the infantry battalion, the accompanying gun company may support one rifle company; quite often, however, platoons will be attached to rifle companies—always the same platoon to the same company. Thus we get down to a real battlefield fighting team—the infantry company-direct fire artillery platoon.

Perhaps these accompanying gun battalions should be manned by field artillerymen. However, the average field artilleryman is not suited by training or temperament for the job. Your artilleryman is too survey-and-slide-rule conscious—as he should be. Perhaps they should be manned by tankers; perhaps by tank destroyers; perhaps the already versatile infantry can properly train them. Whatever color their hat cords, they must be doughboys at heart.

Perhaps the accompanying gun battalion is not the answer. Perhaps the direct fire mission should be performed by tank or tank destroyer units. Perhaps we should move a part of our present organic artillery up in the front lines and take on the enemy by direct fire. Whatever the organization, let us get direct-fire conscious—let us develop the accompanying gun—*let us emulate the champ!*

Current Training Programs and Problems, Army Service Forces

BRIGADIER GENERAL ARTHUR G. TRUDEAU, *General Staff Corps*
Deputy Director of Military Training, Army Service Forces

THERE is a mistaken tendency to consider our training problems solved, now that the Army has reached its ceiling. Despite the fact that satisfaction can be derived from accomplishments to date, any intelligent analysis discloses that many phases of training can and must be prosecuted more effectively, lessons learned each day must be applied promptly, and some retraining must be undertaken to effectively utilize our available manpower. There still remain several hundred thousand men to be trained in this country by the Army Service Forces. These constitute loss replacements, personnel required for rotational purposes, and new units undergoing training. The attempt to keep the number of service units at the absolute minimum, coupled with situations constantly encountered which require the organization and training of additional and sometimes new type units has caused training to be carried out under almost continual pressure in order to provide the necessary number and type of units at the time needed. Sometimes this results in the curtailment of training to an undesirable degree. The fluctuation in the size of training establishments creates a difficult problem as far as the assignment of adequate and competent trainer personnel is concerned. Despite these handicaps, which are normal to war and must be accepted in that light, Army Service Forces units dispatched overseas have given an excellent account of themselves, and in many cases have rendered outstanding service.

An additional problem in connection with training is occurring in overseas theaters. Besides a growing recognition that troop units in order to be most effective must constantly be engaged in a certain amount of training as well as in the conduct of their normal functions, the problem has arisen of retraining personnel who, through wounds or accidents, have become unfitted for return to their previous assignment. No better case can be considered than that of a rifleman who through a severe case of "trench feet" or through loss of use of a joint from a wound is unable to return to his previous combat assignment. Such an individual, through a careful study of his experience, physical condition, and aptitude, can and must be retained to perform some other useful duty. In some cases, such personnel may be returned to their same unit as a truck driver, a clerk, or in some other capacity where the physical handicap involved will not prevent the performance of useful work. Many such individuals, however, and many psychoneurotics who cannot be returned to combat units, must be retrained and utilized in communications zone activities. Failure to do this can only result in shipping such personnel back to the United States, where they must be retrained for useful military assignment or discharged to civilian life. In many cases these men, who have suffered much for their country's sake, can and do perform useful work with a far greater realization of its importance than personnel who are in excellent physical condition. These men are not activated by the supposed glamour of war but by an appreciation that there is a hard, thankless task to be done, and they, as Americans, are willing to perform their fair share of it. Others, unfortunately, have the opposite attitude and their utmost desire is to be released to civilian life, where they can gain the full advantages of high industrial pay and the comforts of living at home without sharing further in the sacrifices that must be made before this war can be brought to a successful conclusion.

The War Department has recently recognized the extreme importance of such retraining in overseas theaters of operations and has instituted policies and procedures that will secure the maximum utilization of all manpower in the theaters. It can be foreseen that if efforts in this direction are successful,

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the percentage of combat replacements, principally infantry, will increase materially as time goes on and the percentage of service forces replacements will decrease. This is as it should be and it is contemplated that before many more months have passed, the number of Army Service Forces replacements sent overseas will be materially reduced and will be confined to those military occupational specialties requiring either the lowest skills or the highest skills. To explain this point, it may be stated that in many tasks we still require men who are physically fit, but who have no special skill. This is particularly true where labor is concerned. On the other hand, skills that require particular aptitudes and longer periods of specialized training such as machinists or radar operators may not be obtainable in sufficient numbers by upgrading or retraining limited assignment personnel overseas, and such specialists must continue to be trained on this side. There is no reason, however, why the bulk of replacements involving such specialists as truck drivers, cooks, clerks, and many others cannot be upgraded or retrained in the overseas theaters of operations from limited assignment men as they become available. The new policies in this regard should effect these results.

In addition to the training of replacements and of new units in this country, the Army Service Forces will be faced with the problem of retraining such personnel as are returned from overseas, either of individuals returned on rotation or of limited assignment personnel who cannot be utilized in the theaters of operations. Such personnel may be returned because they are capable of service in the zone of the interior only, or because the saturation point has been reached where no further limited assignment personnel can be absorbed. This personnel will be further augmented by recovered battle casualties being released from general hospitals in the zone of the interior. The large numbers involved must be carefully classified as to aptitude, experience, training, and physical condition. They must then be reassigned and frequently retrained for useful military occupations. The officer or soldier, for instance, who has sacrificed a limb in the service of his country can well be utilized as a trainer at one of our many training installations, although his skill as a trainer may have to be developed. An alternate assignment might be to a Service Command or in a depot or other installation in the zone of the interior. The success with which we are able to retrain and reassign such individuals will be a measure of the number of physically fit individuals who can be released from zone of the interior assignments and trained for service overseas. We are now applying ourselves diligently to the solution of this problem.

Mention was made above of the necessity for applying new techniques in training and also of applying lessons learned in the overseas theaters. Observations made overseas indicate definitely that the problems of leadership both for officers and noncommissioned officers need more attention, and to this end courses are being instituted for both of the above-mentioned groups at Army Service Forces training centers. The exercise of authority without due consideration for the application of established principles of leadership so necessary to secure the wholehearted cooperation of individuals and the elimination of those characteristics, desires, and instincts so detrimental to discipline, has been too common. Heroic measures are required to improve the quality of our leadership and to impress on all those in authority the tremendous importance of intelligent direction and constant supervision of subordinates, both as individuals and in units. Extensive surveys made among our soldiers in all theaters have indicated the importance that they place on being commanded by leaders with a more complete knowledge and understanding of the problems facing the individual soldier; by leaders who are fully informed in the technique of all phases of training and who require a high standard of performance under tough, realistic battle conditions during field training.

A course in leadership training has now been initiated for noncommissioned officers and prospective noncommissioned officers

Our past system of training has not been one which has sufficiently developed the capabilities of noncommissioned officers. Cadres as a rule have been limited to personnel required for administrative duties, and the result has been that individuals with little or no more knowledge than their contemporaries have been assigned frequently as acting noncommissioned officers during training. This system has failed to inculcate in the average recruit a proper appreciation of a noncommissioned officer's responsibilities. Furthermore, these same individuals, when appointed later as noncommissioned officers, fail to realize their full responsibility for the men under them. Under the system of training that will be discussed briefly in subsequent paragraphs, soldiers selected because of a high leadership potential are assigned to a course in leadership during or after basic technical training. This course must be largely practical, but it is important to instill in these men the same desirable principles of leadership as we try to instill in our officers. It is particularly important to instill in them a desire to assume the responsibilities with which they will be charged and an appreciation of the importance of attitudes both by those who are leading and by those who are led. This course is still in its infancy, but it is felt that more constructive work can be done in this field at the present time than by attempting to secure further improvements in our methods of technical training. The problem of developing leadership for both officers and noncommissioned officers is the paramount training problem facing our Army today.

The training of officer candidates continues to fluctuate with problems of supply and demand. This situation is extremely unfortunate as these fluctuations make the assignment and retention of capable and sufficient trainer personnel extremely difficult. At present, there is an upsurge in the size of officer candidate schools for several of the services. The reasons for this situation need not be discussed here. The problem facing us is an extremely important one, however. Fortunately, we have in the Army at the present time thousands of capable youngsters in the higher intelligence brackets who make excellent officer material. Any officer who is charged in any way with the responsibility for selection of officer candidates should be fully impressed with his responsibility in selecting only the most capable candidates and for not recommending individuals of mediocre caliber who are lacking in either the mental, moral, or physical qualities needed to function under combat conditions. Officers conducting instruction in officer candidate schools likewise have a heavy responsibility in eliminating promptly those candidates who evidence deficiencies which indicate that they should not become commissioned officers. Production line methods in the past have, to some extent, overlooked the importance of this point, but there is no longer any justification for commissioning an individual who is not fully capable of doing at least an "Excellent" job. It is very doubtful if a prospective officer who is considered "Satisfactory" only will ever justify the confidence and responsibility placed in him when he is commissioned. We know only too well that many of the officers who are so rated are not in effect capable officers, but are on the border line where softhearted commanders fail to express the true value of their services when rating them.

A vital phase of leadership training is in providing the individual with the knowledge and technique of handling men. In my opinion, the technical information he acquires during such a course is secondary in importance. Individuals should be selected as officer candidates primarily because of high qualities of character and potential leadership, as we recognize that character established over a generation cannot be changed in a four-month's course; but we must recognize also the importance of imprinting indelibly on each officer candidate the high responsibility that goes with the leadership of men and an understanding of those attitudes and attributes that are so essential to secure their wholehearted cooperation under the most severe combat conditions. Training in leadership that does not reach this high level can be defined as only mediocre at best.

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The majority of our soldiers feel that there has been too little training in the handling of land mines and booby traps and in the operation of enemy weapons, and it is important that enemy equipment of this type be procured in order that troops may be properly trained. A large proportion of our soldiers feel that they have had too little instruction on how to cope with hazards of climate and disease, such as trench foot and malaria, and this type of training is being accented.

I have outlined above a variety of problems still facing the Army Service Forces in the constant attempt to provide better soldiers and better units in the field and also to equip all of the individuals who are entrusted to our care with the knowledge and fortitude that will permit them to survive the hazards of battle insofar as they are able.

To improve the present system of training and provide for the more effective utilization of our available manpower, a new training plan has been inaugurated recently which provides that all personnel available for training will be trained under a single system. For instance, the individual inducted at the Reception Center, together with the soldier released from a general hospital, the physically fit soldier from a station complement, and the soldier who has been returned to this country under the rotational policy may all be assigned to a Signal, Engineer, Ordnance, or other Army Service Forces Training Center. In such an assignment, of course, each individual's training, experience, and aptitude will be carefully evaluated, and within the requirements of the military program he will be assigned where best fitted. Once men have arrived at the training center, however, the same standard of basic military training will be established for all. Thus, during the period in which basic military training is given, the Army Service Forces retain the maximum amount of flexibility as regards future assignment. If conditions overseas suddenly require an augmentation in the number of Signal replacements required and a decrease in the number of Quartermaster replacements required, the soldier completing his basic military training can be assigned equally well from one service to the other. Even in the case of the Medical Department, no soldier is assigned for medical training until the completion of his basic military training. Basic military training will never be less than six weeks in length and conditions may necessitate it being extended to a period of as much as nine weeks. Credit will be given, of course, for any training previously completed.

Upon the completion of basic military training, individuals at a center will normally advance into the phase designated as basic technical training and here receive training peculiar to the service in question. Most of this training is conducted in training centers but certain skills are developed in specialist schools. Courses in these schools vary from a few weeks to several months. Normally at the end of eight weeks of technical training or after a total of fourteen weeks of training, these individuals may then be given three weeks of field training, at the completion of which time they will be qualified as overseas replacements as far as training is concerned, or they may be grouped into units which are activated and organized at the end of the fourteenth week of training and given field training.

There still remains one group that has not been discussed; it comprises those soldiers who are not physically fit for overseas duty. Some of these men, although able to perform duties within the zone of the interior will not be able to undergo all of the training set forth in the Mobilization Training Program. We are no longer justified in attempting to make every man march twenty-five miles per day, nor can we discharge men from the Army because they are unable to chin themselves ten times or more. The clerk who is physically handicapped to the extent that he cannot complete the prescribed training program may still be an extremely competent stenographer, and after indoctrinating him to the maximum extent possible in the duties required of any soldier and of those peculiar to soldiers engaged in clerical or administrative tasks, this individual is then quali-

fied for assignment to some zone of the interior installation. It is not necessary for him to live in a pup tent under severe field conditions, even though such training would be highly desirable if we had sufficient time and manpower to draw upon. Thus, we see that the soldier assigned to the zone of the interior will normally be one who has certain physical limitations. There will, of course, be certain other personnel assigned to the zone of the interior such as those who have been returned from overseas under rotation policies. These men should be assigned where they can best be used for a period of several months before they are eligible for return to another overseas theater.

While this explanation must of necessity be brief, it will be apparent that diligent efforts are being made to train every individual to perform the best service for which he is physically and mentally capable, and by intelligent assignment procedures to assign these individuals so that they can be used to capacity. The size and complexity of the war effort presents many difficulties to the successful accomplishment of these aims, but the results being obtained at present give encouragement.

One source of manpower, new in this war, has been the WAC. Training of WAC's prior to their assignment to zone of the interior installations and overseas theaters follows, in general, the plan for training male personnel. Six weeks required basic military training are followed by eight weeks of technical training where necessary to convert civilian skill for Army use. Special training of two weeks is given enlisted women and officers ordered overseas. Experience has indicated a wide variety of jobs which can be done by WAC's and for which training is provided, but the relatively higher efficiency of women at clerical and administrative tasks has resulted in an emphasis on this type of training for WAC's. In addition, WAC's are trained by Army Service Forces for assignment as Medical Technicians, Photographic Laboratory Technicians, Radio Operators, Draftsmen, Motor Transport Operators, Cryptographers, and Teletypists, to mention but a few.

The new training plan is also having very beneficial effects on Army Service Forces personnel procedures. The use of the training center as a pool to which all unassigned and excess personnel can be shipped is decreasing materially the number of individuals awaiting assignment, in transit between two points, or otherwise lying idle. The routing of personnel has been simplified by more than fifty percent by the newly established procedures. A discussion of this subject is not pertinent to this paper, but the coordination of all the problems outlined above should readily convince any reader that the training problems of the Army Service Forces have by no means become routine.

There are, of course, other special problems of training which may be mentioned briefly here. For instance, efforts are being made to impress all commanders that an individual can never cease training, no matter to what functional or operational duty he is assigned. This statement is true for a unit as well. In a recent inspection of an overseas theater, it was very apparent that accent on operational duty to the exclusion of training was having an adverse effect on the quality of performance of the operational duty itself. Standards of training and discipline are criteria as to the efficiency of operations, and where they have been neglected, operations have suffered. As a consequence, here in the zone of the interior the continued training of all units and individuals throughout the Army Service Forces is a matter of constant concern.

We are faced, too, with the problem of training general prisoners and others undergoing punishment or restriction. The various Service Commands operate rehabilitation centers in which we attempt to restore soldiers who have deviated from the path of duty. These remedial efforts have been very successful, and many a soldier who, through lack of understanding or the irresponsibility of youth, has erred in his ways has been restored to useful service.

Another interesting activity has been in

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connection with the operation of Special Training Units. These units embrace all men who are segregated at Reception Center level because of the absence of the necessary literacy qualifications. Many such individuals have been denied opportunities for education, whereas others are in the group who are foreign born, and as a consequence are unable to use our language effectively. The results in these units have been most gratifying, as more than eighty percent of the tens of thousands concerned have been "graduated" within a three-months' period and sent to military duty. Many of these men are earnest individuals who will become good, if not outstanding, soldiers. It has been an interesting attempt to salvage some of our underprivileged manpower, and these training efforts may provide a guide for even broader attempts in the postwar educational field.

One phase of training responsibility has to do with the operation of the Reserve Officers' Training Corps, State Guards, Army Specialized Training Program, and other organizations which train for the Army. In passing, it might be said that the Army Specialized Training Program, because of circumstances, has undergone many modifications and changes. The recent shortage of overseas replacements has caused a sharp reduction in the numbers being trained, but the value of the program has been proven. A large number of men who had undergone Army Specialized Training in the colleges are now in officer candidate schools or undergoing technical training for responsible assignments. Though it is not yet possible to evaluate fully the problems encountered, the observations made, and the lessons learned in the execution of this program, it may be stated with confidence that our educational methods and policies stand to gain greatly from the experiences of the Army Specialized Training Program.

This brief résumé of current training programs in the Army Service Forces would not be complete without some reference to pre-induction training. In the final analysis, the speed and efficiency of our training is determined largely by the background of knowledge, skills, and attitudes the trainee brings with him into the Army. Through our Pre-Induction Training Section we have told schools of the nation what they may do to prepare their students for Army life and Army training, and their response has been most gratifying. It is safe to say that such pre-induction training has saved the Army millions of man hours of post-induction training time.

A compilation of policies, directives, and procedures governing this training was published recently as Army Service Forces Manual M4 (Military Training). Current plans contemplate a re-evaluation and consolidation of all training programs and instructions about September 1944, with a view to simplifying the many problems arising in the field. The greatest need at present, however, is the same as it has been—intelligent interpretation and capable execution of existing policies and doctrine.

Keeping Down the Dust in Italy

From an observer's report on the Italian campaign.

SPRINKLING of the terrifically dusty Italian roads by corps engineers to ease the maintenance problem is paying large dividends along the lines of speeding up supply and troop movements, reducing traffic accidents, lessening wear and tear on motor vehicles, and aiding morale. This last factor alone seems to be worth the cost and effort put out by the engineers in order to keep the dust down. The psychological effect causing the soldier to believe that such a project is done mainly for his comfort is not to be overlooked.

The Fifth Army Learned!

Staff Organization and Procedure and Tactical Lessons in Italy

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This article was prepared by Colonel Wood in response to a request to Lieutenant General Jacob L. Devers for an article on staff procedure and tactical lessons learned by Fifth Army in Italy, and was forwarded with a letter of transmittal by Major General A. M. Gruenther, Chief of Staff, Fifth Army. Colonel Wood was assigned to the "Fifth Army Group" in Algeria which planned the activation of Fifth Army. When Fifth Army was activated 5 January 1943, Colonel Wood became Executive Officer of the G-3 Section, which position he still holds.—THE EDITOR.

TO write a short article on staff procedure and on tactical lessons learned from a particular campaign lays one open to the charge of discrediting the tremendous amount of basic material which has been written on such subjects as well as those specific articles and reports which constantly appear. It can be said that no really new staff doctrines nor changes in the tactical principles enunciated in our field manuals have been discovered as the result of the campaign of General Clark's Fifth Army in Italy. The teachings of our general and special service schools are still basically sound and all experience gained by Fifth Army emphasizes this point. However, it is undeniably true that in any campaign of any army certain principles become more pertinent than others. This is due to the fact that armies may vary in their composition, their armament, their readiness for combat. It is also due to a great extent to the type of problems which face armies, such as terrain, weather, supply, and above all, the nature of the enemy and his capabilities.

Because Fifth Army was the first American headquarters to have under its command large formations of Allied troops and because it has fought a campaign in adverse weather conditions and over a terrain which strongly favored the defense, certain principles have proved more important than others. Certain staff procedure has been evolved which differs slightly from the American basic concept. The selection and emphasizing of such salient points is the scope of this paper. Further, a treatment of these subjects will be almost entirely from the G-3 angle, with such references to other general or special staff sections as appear necessary to complete the picture as G-3 sees it.

STAFF ORGANIZATION AND PROCEDURE

Very early in the planning for Operation "Avalanche," it became apparent that Fifth Army would consist of one American corps and one British corps, with a French corps to be added later. Obviously, there were problems peculiar to the British and French organization, equipment, supply, and administration which were different from American practice. It became necessary then to add to Fifth Army Headquarters first a British increment and later a French increment. After the capture of Naples, when Italian combat and service troops were made available to Fifth Army, an Italian increment also was added.

In general, these increments were integrated into subsections of Fifth Army Headquarters. This was not too difficult in such sections as Artillery, Antiaircraft, Surgeon's, and Signals. In other sections, however, it became necessary to effect a compromise. For example, in the British Army, "G Ops" Section not only handles the tactical missions of our G-3 Section but also certain G-4 work (issue of controlled stores), combat intelligence of G-2, and air support control. The British also have a "Staff Duties" Section which handles the work of the organization subsection of G-3, considerable G-1 work, and part of what is handled by the Secretary to the General Staff in an American headquar-

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ters. On the G-4 side, the British supply system also includes the handling of transportation and to a certain extent maintenance and repair.

A compromise was effected in most of these cases whereby some British officers worked as part of as nearly corresponding American sections as possible, and others were retained in a separate group to handle problems peculiar only to British organization and equipment which had no real counterpart in the American system. With the French, due to the fact that the French had American equipment, the differences in staff procedure were less. However, the same system was adopted here of integrating certain French officers into the American sections and keeping the remainder as a separate group. Inasmuch as not many Italian units were involved, Italian representation at Headquarters Fifth Army was kept to a minimum and in general their staff procedure was modified to correspond to ours.

The success of Fifth Army is testimony to the fact that the solutions reached functioned not only satisfactorily but in a superior manner. It is true that there were many minor points of conflict, but the settling of such points resulted in closer understanding and more efficient operation.

The army staff was early indoctrinated with General Clark's idea of helping subordinate units as much as possible. This attitude was productive of team play within the army staff and within the army. It has certainly always been an agreeable, friendly, happy staff.

The Allied composition of Fifth Army made it necessary to put great stress on the basic concept of staff procedure which demands that actions by one section which concern other sections should be thoroughly coordinated. The nature of the campaign was also such that it was imperative that every staff section concerned be kept fully informed of contemplated operations and day by day progress of those operations.

General Clark established a planning group to formulate the basic plans for the invasion of Italy and operations to include the capture of Naples. This planning group, which contained representatives from all sections, was dissolved as such when the assault convoys sailed for Italy. It was not until after the capture of Naples and the development of the German line along the Volturno River that it became apparent a static situation was developing due to prepared enemy positions and the fact that the impetus of the initial assault had been slowed down. At that time it became apparent to G-3 that it would be necessary to organize a planning group as a permanent part of the section. This group at times, for example when Operation "Shingle" (the Anzio-Nettuno amphibious landing) was directed, contained members of sections other than G-3. However, during most of the campaign north from the Volturno to Rome the planning subsection of G-3 consisted only of G-3 personnel which, however, worked with representatives of the other sections in formulating its plans. For example, the Engineer prepared terrain studies and road maps; G-4 prepared estimates of supply necessary and planned the location of his dumps in order to support the advance; Antiaircraft planned its dispositions to protect river crossings and defiles in mountainous area; the Artillery Section grouped its heavy artillery to provide the maximum support of the main front.

A noteworthy departure from prescribed organization was the creation of the Army Air Support Control Section. This section, composed of ground force personnel, served as liaison between the Army and the XII Air Support Command (later the XII Tactical Air Command) which has been in support of Fifth Army operations since D-day of the Salerno landings. The Air Support Control Section, utilizing communications provided by the Air Force, processed all requests from forward units for air support, planned in conjunction with G-3 the attack on targets to assist a planned ground attack, and established and kept up to the minute the bomb safety line. Air Support Parties were kept forward with corps and divisions and liaison groups were kept at the bases of air units which supported the advance. At times, the

system of "Forward Controllers" was tried and functioned successfully, particularly in the final break-out of the Anzio beachhead forces.

Air Support Control, in coordination with G-4, also handled requests for air re-supply missions. G-4 developed a system which provided containers, previously packed with balanced quotas of rations, ammunition, water, and medical supplies, which could be dropped in response to requests from isolated ground units. Because such units were normally partly surrounded by the enemy, fighter bombers rather than transport aircraft were usually employed.

The question of air-ground recognition was one to which Air Support Control, the Air Force, and all ground units gave considerable thought. Experience indicates that, in a fluid or mobile situation, there is no foolproof method of insuring recognition. The antiaircraft units, tying in with Fighter Controllers and placing heavy emphasis on IFF procedure and restricted flying zones, managed to confine its firing on friendly planes to a minimum. An accurate bomb safety line and marking of forward positions by smoke as a last resort kept down attacks on ground troops by friendly aircraft. However, it cannot be said that there were never instances of mistakes on both sides. It is probable that close air support and tight antiaircraft defense must carry with them the possibility that errors will be committed. Observation has indicated that the German is no less safe from his own fire than we are. It is a concomitant of air-ground warfare.

After the failure to crack the Cassino position, the decision was reached to regroup Fifth and Eighth Armies for a major effort towards Rome. This meant the movement of large bodies of troops from one side of Italy to the other and their regrouping in new localities. The Fifth Army zone of action on the southern front was reduced to roughly half the front which it had previously held. Further, the new Fifth Army zone, particularly in its rear area, consisted of a considerable amount of flooded terrain which was unsuitable for bivouacs. It was necessary at this time, therefore, to assemble a special subsection under the designation, "Movements and Bivouacs." The basic concept of this subsection contemplated participation by G-3, G-4, and the Fifth Army Transportation Section. The coordination of all movements and the assignment of selected bivouac sites made possible the successful assembling in the new Fifth Army zone of all troops destined for the attack.

It might be noted at this point that the Transportation Section, as such, is not recognized in the Army T/O. Early in the occupation of Italy, however, when it became apparent that the enemy was bent on a policy of total destruction of railroads—including nearly every tie and rail—the need for highway traffic control was seen. The notable absence of major roads, which funnelled all traffic onto few routes, also contributed to this need. The Army Transportation Section was organized, set up traffic control posts at critical intersections, and prescribed all routes, timings, and movement of convoys through the army area. Its efficient performance was a major factor in prompt tactical moves. Without it, the army supply system, dependent as it was on long truck hauls, would have broken down.

Another subsection of G-3 which had a substantially large amount of work to do was the Training Section, particularly during the long period of almost static warfare when units were brought back to rear areas for training in order to attack successfully the peculiar problems presented by the terrain. For example, mountain warfare teams were set up which gave short courses covering the essential points of mountain warfare—the use of ropes, slings, aerial cable, pack transport (both animal and man), care of the feet, and the evacuation of casualties. Special training was also initiated when river crossings or amphibious landings were contemplated.

After the Anzio-Nettuno beachhead was established, it became apparent that the main forces on the southern front would not be able to contact the beachhead troops for some time. It was necessary to set up an LST-

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LCI(L) ferry from the Naples area to Anzio. This ferry was placed under the control of a subsection known as Fifth Army Ferry Control, whose duty it was to plan the loading and shipping of all available craft. The LST's and LCI(L)'s shuttled back and forth between Naples and Anzio from approximately the first of February until after the main forces and beachhead troops finally joined late in May. During this period, it handled efficiently the shipping of all troop units, supplies, replacement personnel, and matériel, as well as the evacuation of many casualties, or units which had been replaced in the beachhead. Its efficient functioning was a major factor in the Fifth Army's success in keeping the beachhead not only supplied, but prepared for the eventual break-out.

Another point in staff organization which early became apparent to G-3 was the lack of liaison officers provided by T/O's. Even from the first days at Salerno the inability of normal communication channels and routine reports to keep the Army Commander informed of the situation made it necessary to send G-3 officers to lower units. These officers made many trips during the battle of Salerno Flats and returned with up-to-the-minute information on locations and dispositions of the forward elements. When Fifth Army advanced northward and became spread over a large mountainous area in which communication was difficult, the use of liaison officers again proved necessary. While, in general, in the American system it is contemplated that liaison officers will be furnished from lower to higher units, experience has shown that this system is not always satisfactory from an army standpoint. Where a small unit such as a separate battalion is attached to a division, the furnishing of an officer from the battalion to a division is satisfactory because the division wants information as to the capabilities of the battalion and wants to transmit its orders to the unit. From the army picture, however, in dealing with corps and separate divisions, the army has already issued field orders or operations instructions which prescribe a scheme of maneuver over a period extending into the future. In general, then, additional orders are a very minor part of a liaison officer's work. His principal activity is to enable the G-3 Section to keep informed immediately of the positions of front-line troops in order that the Army Commander may adjust the operations to capitalize on the situation. Such information also evaluates the location of the bomb line and the proper utilization of supporting air power. Representatives from corps are not sufficiently informed on the "big" picture nor are they necessarily capable of answering all questions which may be put to them when they arrive at army headquarters. On the other hand, the sending of officers from army who know the general plan of maneuver and the general situation on the entire front, and who are armed with questions to ask on their arrival at corps which will produce the desired information when they return, has proved a much more satisfactory solution.

To summarize the above paragraphs, which may seem to depart somewhat from the subject of staff organization and procedure as such, it is again pointed out that except for the necessary modification of staff organization due to the Allied organization of Fifth Army and the nature of the campaign, the basic principles of staff organization are still sound.

It is still necessary to "keep the troops informed."

It is still necessary that planning be anticipatory in nature.

It is still necessary that staff officers should be prepared to work quickly and efficiently.

It is still necessary to retain flexibility.

Tactical Lessons

What are tactical lessons? Are they not essentially the reaffirmation of the principles of war which all great military leaders have held are basic regardless of the weapons used, the terrain over which the battle is fought, or the equipment which is utilized? It is true that in the period between the operations of the Macedonian Phalanx of Alexander, the Roman Legions of Caesar, the well-drilled

battalions of Frederick the Great, and the far-ranging Eagles of Napoleon up through our own War between the States, the first World War, and the present great conflict, the dress and armament of the soldier, his supporting weapons, and the vehicles which give him mobility have undergone such changes as to cause some writers to say that the art of war is changed. I submit that the art of war is basic and that the principles of war, such as that of surprise, of mass, and of movement, are just as true today as they were when Clausewitz stated them.

There have been no new tactical doctrines discovered by Fifth Army nor is it likely that there will be. However, Napoleon has been credited with saying, "Italy is a boot; to conquer it, you must enter it from the top." Fifth Army entered almost from the bottom. After the capture of Naples in twenty-one days, it ran into a fixed defense line against which it inched slowly ahead through a long, wet, and muddy winter. The hill masses of Italy definitely favor the defender. The German was always able to perform a slow withdrawal by using a minimum of troops to hold a maximum of Fifth Army forces. This gave him time to construct a defense line which, when Fifth Army reached it, withstood assaults of troops already tired from fighting a long campaign. The regrouping of those troops, the resting and training of personnel, and the launching of a coordinated attack which drove from the Garigliano to north of Rome in twenty-five days is already a classic. The movement of II Corps and the French Expeditionary Corps from the main front and the break-out of VI Corps from the beachhead will go down in history as a soundly conceived and brilliantly executed tactical operation. Its success may definitely be traced to the things which Fifth Army learned since coming ashore at Salerno; things which re-emphasize American training and marked it as basically correct.

In that long campaign in hills and valleys, Fifth Army had learned that to attack successfully high ground held by the enemy, one must first get on high ground himself. It had learned that mountains are not necessarily obstacles if the principle of maneuver is followed, the position attacked from its weakest sides, and the attack carried home with aggressiveness and determination. It had learned the truth of the age-old principle which states that if the position is flanked it is untenable. It had learned the value of infiltration. It had learned that ground once gained must be quickly dug in and held. It had learned the value of attacks in depth.

All of these things are taught, but all of them become more obvious in this campaign. Fifth Army learned that the enemy was quick to shift his troops to a threatened position. It learned that it must coordinate its attack all along the front in order to contain enemy elements which would otherwise be moved to halt the main effort. It learned that the German always counterattacks if he has the slightest capability of doing so, and never leaves a position until he is forced out of it.

Fifth Army learned also that so far as this terrain is concerned the opportunities for the employment of large armored units were almost non-existent. On the other hand, it also learned that small groups of tanks may be employed with infantry in what at first glance seemed impossible terrain—mountain trails, gulleys, stream beds, unimproved roads, even the crests of small hills. It learned that tank destroyers and artillery must be landed early in amphibious operations and river crossings and must be brought forward quickly in any attack to break up German counterattacks, which were nearly always accompanied by armor. It learned the value of the infantry-tank-tank destroyer-artillery team. It learned that in "compartmented" terrain it is often necessary to improvise small tactical groupments, small task forces in order to achieve particular objectives. It learned the value of mule pack trains and even of pack boards for man-carrying of supplies; and it learned the necessity of having fresh reserves available to pass through and exploit successes.

Fifth Army, in the long days in Africa between its activation in January 1943 and initiation of the Italian invasion in September of that year, tried to anticipate many of the

things which afterwards proved so important. It did this by setting up a series of schools which utilized the experience of the Tunisian campaign as well as experience which was brought from other theaters of war. These schools were as follows:

a. The Fifth Army Engineer Training Center covered mines, booby traps, and general engineer instructions for both engineer personnel and personnel of other arms and services where applicable.

b. The Fifth Army Leadership and Battle Training Center gave instruction in combat leadership and tactics to cadres of instructors from combat units. Later, on the same terrain, units were trained by these instructors. Emphasized were physical hardening, "crack and thump," and battle inoculation in which a close approach to realism during field exercises was obtained by the use of much live ammunition, both small-arms and artillery, and simulated mines and booby traps.

c. The Fifth Army Airborne Training Center was established primarily to provide training facilities for airborne units. Development of procedure in airborne units, including troop carrier units, was carried on in preparation for specific operations such as the Sicilian landings. A replacement battalion was attached to the center. Surplus men of airborne units were transferred to this battalion and, trained by the center in parachute jumping, became parachutist replacements.

d. The Fifth Army Invasion Training Center, in conjunction with the U. S. Navy, trained divisions and corps combat units for amphibious operations. French as well as U. S. units were given two weeks intensive courses in landings on hostile shores, both shore to shore and ship to shore. Simultaneously, schools were conducted in waterproofing, for transport quartermasters, reduction of beach defenses by demolitions, and related subjects.

e. The Fifth Army Tank Destroyer Training Center was established to train tank destroyer battalions in the most recently developed methods of employment of these units. Indirect fire, using artillery methods, was taught.

f. Various other schools were conducted in bomb disposal, enemy weapons, chemical warfare, air OP, and signal communications. In general, these schools were mobile, traveling to points which required least travel of students attending.

Upon receipt of U. S. equipment, French divisions and corps troops were trained in the care, operation, and maintenance of weapons, matériel, and vehicles. It was found that training teams of U. S. instructors were best suited to this task. Officer and enlisted specialists were attached to and lived with the units during the training period.

The above schools functioned efficiently and gave Fifth Army troops additional experience over and above their basic training in the States to fit them for the anticipated operation. Even so, it is undeniably true that many things, even though they are emphasized in schools, are not brought home until the individual goes through the experience in actual combat and finds out for himself their value. Fifth Army also organized in Italy a school in scouting and patrolling and in sniping. It organized mountain training teams which have been mentioned above. Due to the shortage of infantry replacements, it was at one time necessary to embark on a program of converting selected replacements in Tank Destroyer, Antiaircraft, Quartermaster, etc., to infantrymen.

The above discussion has been general in nature and attempts only to survey the broad field of tactics as applied to the Italian campaign and to make the point that basic principles are still sound and their re-examination in the light of this campaign should only serve to emphasize the importance of those particular principles which apply more strongly in mountainous country than in other terrain. Specifically, however, some of the things can be listed which proved of value in furthering Fifth Army's advance. These appear in the paragraphs below.

Infantry

a. Mountain Warfare.

1. The enemy uses reverse slopes both for defensive positions and as a plan to safely maintain the bulk of his forces. We tend to neglect rear slope defenses.

2. Units that might be used in mountainous country should be well trained in small unit operation. This training should be extended to individual operations.

3. It has been found that the seizure of selected terrain features one at a time was necessary to the success of a large maneuver.

4. Dominating heights must be seized, valleys and approaches avoided, and units must work along the high ridges and down to force the enemy from his positions.

5. For troops about to enter a mountain warfare campaign, physical conditioning should be foremost among all training subjects.

b. River Crossings.

1. Ground reconnaissance must be carefully controlled to avoid giving away plan in detail (controlled by corps and divisions).

2. To avoid some of the dangers from ground reconnaissance, commanders and staffs should work as far as possible from large-scale obliques of the river area.

3. It has been found that infantry can operate the assault boats, while engineers were best in building and operating rafts.

4. Artillery observers should cross with infantry if terrain is such that observation can be brought to bear on the enemy from initial objectives.

5. If artillery preparation is fired with a following rolling barrage, infantry must follow rolling barrage very closely as enemy many times relies on alternative withdrawal positions from which he quickly occupies forward defenses as artillery fire lifts.

c. General.

1. The follow up of infantry after air or artillery bombardment must be immediate and aggressive, employing the maximum infantry strength available.

Artillery

a. In heavily defended towns our artillery is unable to give close support fire.

b. In certain mountain terrain close coordination with infantry is necessary to cover zones of fire. Infantry must be notified of location of dead spaces to enable organic infantry mortars and attached 4.2 chemical mortars to be so placed as to cover such dead spots.

c. The principle of employment of artillery in mass was a deciding factor in successful artillery operations.

d. The employment of heavier artillery weapons so placed as to cover entrance bridges to the enemy's battlefield was successful to a high degree in isolating in part his immediate battle front.

e. When tank destroyers cannot be employed in their primary role due to terrain, it is possible to utilize their fire power in the artillery fire net.

f. The practice of taking sound and flash detachments from battalions for service with the divisions is not practicable.

Engineer

a. Dozers must operate forward with tanks. There is a need for properly designed and armored dozers.

b. Satisfactory means of detecting nonmagnetic mines have not yet been developed.

c. Initially the volume of traffic over a bridge is important. The traffic control officer, or MP officer, should be informed of speed limits that bridge capacity will take for different type vehicles so that the flow of traffic may be expedited. It is wasteful to set a five miles per hour speed for heavy vehicles on a class 40 bridge and oblige a convoy of light vehicles to maintain same speed and spacing.

d. Engineer Sections of corps, divisions, and higher headquarters should see that all troops are acquainted with types of enemy mines and removal of same. Our service troops many times are involved with our combat elements, especially in fast-moving situations.

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e. The doctrine of avoiding obvious crossing sites is not always practical. Surprise may not be renounced, and assault crossings operate above and below the site. Deception can be deliberately made at the time of the operation. A good site is necessary and fire power and shock should be used to the fullest extent rather than attempt bridging at a poor site.

Armor

a. Tanks can support a river crossing by close fire, and after crossing can be used in limited numbers to clean up small pockets of resistance.

b. Tanks must be prepared to break out before first light and exploit at first light.

c. The principle of movement and fire by bounds with tanks mutually supporting each other has proved sound.

d. The use of recognition pennants in close mountain country has been found to be a disadvantage rather than an advantage. They gave away tank positions and would appear to be of value only in wide open country, such as desert, where enemy and friendly tanks become intermingled in action.

e. When tanks fire without movement (as in standing artillery positions), engines should be run enough to clear interior of cordite fumes.

f. Tanks in street fighting have had two principal uses: breaching of buildings and as antitank self-propelled guns.

g. In a landing, or river crossing, tank destroyers or other antitank weapons must have the highest priority of crossing.

Tactical lessons from the Italian campaign can only be summarized by saying: The things which have been studied and taught are still true. Remember them; rely on them. If they are not of use in a particular campaign, they may be of the greatest use in another. To forget them is to let the mind atrophy through lack of use. Fifth Army includes all this in its motto: BE ALERT AND LIVE!

Ordnance Intelligence Activities

CAPTAIN EDWARD I. CREED, *Ordnance Department*

AT the outset of this war the need for information concerning the capabilities of enemy weapons was recognized by the Ordnance Department. A group of officers and enlisted men was selected and sent to Aberdeen Proving Ground, Maryland. Here they were given all information on the trends of American ordnance and trained in what enemy weapons were then available.

Teams of these specialists were formed and sent to the various active theaters. They were furnished for operation under the control of the theater commander for the purpose of aiding the theater commander in securing captured equipment and insuring the flow of such equipment to the States. These teams were usually assigned to the assistant chief of staff, G-2, in the theater. They were permitted to accompany task forces and to aid in the interrogation of prisoners of war. Training programs were prepared and conducted for the combat troops in the use of enemy weapons and equipment. Information of tactical value on enemy equipment was collected by them and furnished the G-2 section for distribution to units concerned.

As a result of these teams, much enemy equipment was returned to the States for research, and because of such research many improvements were made in our own weapons with the minimum amount of time spent in development.

Due to the success of these Ordnance Department specialists, War Department approval and concurrence of the theater commanders obtained to increase these teams to include Quartermaster, Signal Corps, Chemical Warfare, Medical, and Engineers. An Enemy Equipment Intelligence Service Team was formed by the War Department Army Service Forces to perform, on a broader scale, the same functions as the Ordnance Intelligence Teams. Some theaters are now supplied with such teams and their services have received high praise from those connected with them.

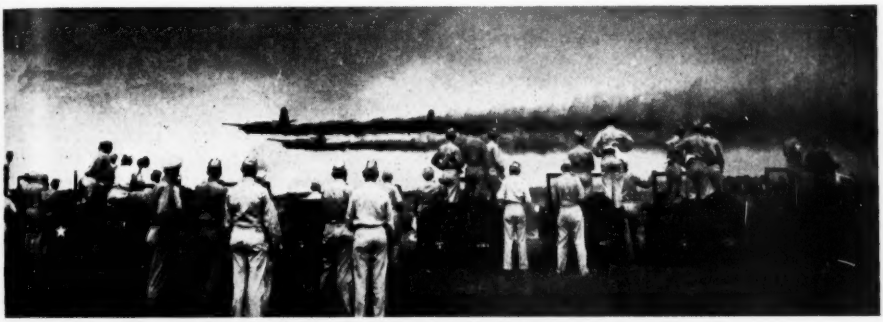
The Mission of the Army Air Forces School of Applied Tactics

COLONEL H. W. HOLDEN, *Air Corps*, Commandant

THE Army Air Forces School of Applied Tactics at Orlando, Florida, is engaged in correlating and interpreting to selected personnel of the armed forces of the United States, and of the other United Nations, the proper employment of air power in the current global air warfare.

It is thus apparent that the school differs fundamentally, in many respects, from all other training installations of the Army Air Forces. It can best be described, perhaps, by first pointing out what it is not.

The school is not concerned, for example, with individual instruction in the basic techniques of any military occupational specialty. Whatever the rank of particular students—and they range all the way from key enlisted men to general officers with broad and varied backgrounds—the application of individual and unit skills in their tactical context is the true subject matter of each of the fifty-odd courses offered in the school. It makes no difference, except in detail, that certain courses deal with the routine operations of basic tactical and service units, and that others survey the entire range of employment of major air force components, both alone and in conjunction with other forms of military and naval power. Neither does it make any difference that courses of the first type are directed to the lower echelons of an air command, and that courses of the second type cover the air aspects of higher staff planning. The aim in each program of instruction is to acquaint the respective students with so much of the total air picture as it is desirable for them to know in order that they may view their several responsibilities in proper perspective, and to impart this information in the light of the most recent lessons learned in battle.



AAF SENIOR OFFICERS WATCH DEMONSTRATION OF AIRPLANE ATTACK.

It follows that the content of the school's teaching is not determined solely by, or limited to, the standard training publications or established doctrines of the Army Air Forces. This is not to imply that doctrine is disregarded or contradicted. On the contrary, official pronouncements are the foundation of all that is taught in the school; but in line with what has been stated above concerning the character of the students and of the teaching mission, this doctrinal foundation is treated as a foundation and not as the entire structure of the various training programs. A fluid military situation moving with ever increasing offensive tempo, and the rapid maturing of ideas which inevitably results from the forcing processes of war, require both changes of emphasis and revisions of substance, or at least of interpretation. The school endeavors to keep itself fully re-

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sponsive to all tactical changes as they occur in the theaters, without, however, committing itself to the outcome of every isolated experiment as if it were final and universal. It is well aware that it is training its students not for the battles of yesterday or even of today, but for the probable campaigns of tomorrow. While it cannot, therefore, remain tied to the past, neither can it allow its instruction to be shaped by spot news flashes. Comparative studies of new and old tactics and of differing tactics developed in widely separated combat theaters are continually conducted. The accuracy achieved by the school in discerning tactical trends and in forecasting possible revisions of doctrine would be one measure of its success.

In order to carry out its unique and complex mission the school naturally depends upon maintenance of the closest possible liaison with each of the combat Air Forces. It accomplishes this in several ways: first, by receiving and circulating among its staff a wide assortment of current intelligence and other reports, from both American and foreign official sources; second, through a gradual turnover of instructor personnel, the replacements consisting, for the most part, of combat veterans, often with wide experience and distinguished records; third, by interrogating visiting officers fresh from the theaters, representing all arms and services of the United States and of its allies; and fourth, by sending to the theaters members of its own staff as observers who, besides being qualified in their respective military specialties, are familiar with the problems and requirements of the school.

The School of Applied Tactics is greatly aided by the fact that it is a part of the Army Air Forces Tactical Center, which commands a small though representative air task force, complete with service and communications units, operating from dispersed airdromes in nearby sections of central Florida. The Tactical Center's air force makes a double contribution to the work of the school. It provides demonstrations of the new tactics and techniques which have been dissected in the classrooms. It also conducts operational training of such of the students as constitute cadres of newly activated squadrons and groups, during a period immediately following the conclusion of their academic and synthetic training in the school.

Equally important is the benefit which the school derives from the presence on the post of the Army Air Forces Board. Although the board is not technically a part of the Tactical Center, it makes use both of the operational facilities of the center and of the research facilities of the school in carrying out its mission of reviewing, testing, developing, and recommending from the tactical standpoint doctrines, procedures, techniques, and equipment for the Army Air Forces. The board sustains approximately the same relationship to the Proving Ground Command at Elgin Field, Florida, as it does to the Tactical Center. This fact completes a picture which, in the aggregate, may be described as a combination experimental laboratory and post-graduate school, with a model air force serving the needs of both. The board contributes directly to the work of the school both by supplying specialists as lecturers, and by making available a wealth of information which could not readily be obtained from other sources, if at all.

It will thus be seen that the essential purpose of the School of Applied Tactics is to serve as a central clearing house at which the often hasty improvisations of world-wide air warfare may be given sober second thought, and to disseminate the results of this thinking to key personnel about to assume positions of greater or lesser responsibility in the same global conflict. Although in time of war the generating source of tactical requirements, and of at least temporary or provisional solutions, will be the combat theaters themselves, there is obvious need for just such a clearing house which is also a school. Not only must the grain be threshed from the chaff, as already suggested, but the grain itself must be distributed. It can be distributed most effectively through individuals who, having been indoctrinated themselves,

will indoctrinate others in the theaters to which they are assigned.

The mission of the school has naturally been modified from time to time in keeping with the progress of the war, but the underlying principle has remained constant. In the words of AAF Reg. 20-14 establishing the school, its function is and always has been to train "selected students academically and under simulated combat conditions." In the early months of our participation in the war, while the crucial need of the Army Air Forces was expansion, the School of Applied Tactics was called upon to train key personnel from cadres of newly activated tactical and service units of all types, including the arms and services key personnel appropriate to them. Later, but even before the activation program began to near its goal, the need for properly qualified staff officers at all levels, an inevitable consequence of expansion, became acute. The school was therefore required to design a special course for the training of staff officers for intermediate air commands, and also became a participating institution in the Army-Navy Staff College, presenting the air phase to Navy, Marine Corps, and Ground Force officers, as well as to Air Corps officers who were being groomed for staff responsibilities in connection with combined operations. A third program of similar scope was created for students representing the commands and staffs of corps and divisions, which was later transformed into a refresher course for senior air officers. Members of allied armies and air forces, as well as Americans, have received training in all three of the courses above mentioned. Additional staff training requirements for senior flight surgeons, and communications and weather officers, are also being met with appropriate courses. Altogether, the School of Applied Tactics has reached a total of more than 23,000 officers and approximately 18,000 enlisted men since the organization of the school in late 1942.

The same considerations which prompted the establishment of the School of Applied Tactics in wartime indicate the desirability of continuing its functions after the return of peace. If there is to be a permanent air force of any considerable size, there will clearly be the same need as exists today for the testing, development, and dissemination of new tactical concepts. In one sense the need may be characterized as even greater in peacetime, and likewise the opportunity for satisfying it, because of the lack of an enemy. Some substitute must be found for hostile ingenuity as a stimulus to our own thinking and as a starting point for new ideas. Diversified field experiences can provide the raw materials of doctrine, but only recurrent meetings of responsible leadership in some central place can refine them into doctrine, and at the same time provide the cross-fertilization of minds necessary both to standardization and to continuing progress. For this vital purpose, time and the orderly rotation of the best qualified personnel are both required. Neither requirement can be met fully in time of war.

BOMBARDMENT GROUP PRACTICE DITCHING.

Practical Suggestions for New G-2's

LIEUTENANT COLONEL KENNETH C. DOWNING, *General Staff Corps*
Instructor, Command and General Staff School

The author was G-2 of the 41st Infantry Division for over two years in the Southwest Pacific Area, and during that time participated with the division in the Netherlands East Indies, Papuan, and New Guinea campaigns.—THE EDITOR.

THIS article is written with the thought that it might be of assistance to those officers who are assuming new responsibilities as Assistant Chief of Staff G-2 in a division.

The responsibility placed on an officer who has been assigned to the general staff is staggering, to say the least. He may have served on a regimental or battalion staff, in which case staff procedure is not entirely new to him, or he may have been a company officer who has had no staff experience, or he may have graduated from the Command and General Staff School, but in any case he has no doubt formed his own ideas as to the relationship of division staff officers to the troops and, as is often the case, these relationships have not been ideal. As a general staff officer, he has no command except over his own section, and the attitude he takes toward the subordinate units will be one of the biggest factors toward his success or failure. He must realize he is there but for one purpose and that is as an adviser to the Commanding General and also to the subordinate units on matters pertaining to intelligence. It is true that there are many phases of intelligence for which he is responsible, but the ultimate goal of a G-2 is to be able to advise his commander promptly on all phases of intelligence and suggest ways and means of making changes when necessary.

The first thing a new G-2 must do is to assure himself that he is properly prepared to assume his responsibilities. If he is a graduate of the Command and General Staff School, he will have at least a well laid foundation upon which he can improve his professional knowledge. The fact that he has had this training does not mean he is well equipped for his assignment. It will be necessary to burn a lot of midnight oil perfecting himself in all the subjects he as G-2 will have to handle. He must study the field manuals and other documents covering his subjects and continue to do so until such time that he feels he can dispense with them, which will probably never be the case, as intelligence is so broad and there are so many side lines which have a great bearing on it that there will always be new problems confronting him. This constant study by the new G-2 will, or should, never cease until after he has been relieved from that assignment. Don't ever fail to be continually improving your knowledge of your duties.

Upon assuming your new duties, you will be amazed at the enormous amount of administrative duties connected with your section. Don't let that perturb you. If you're fortunate to be relieving a predecessor, he will have built up a good group of enlisted men and will also have obtained a good assistant, all of whom will have been in the section long enough to continue without interference from you. Turn the office administration over to your assistant and chief clerk and don't attempt to make any changes until you know you are right. You'll have so many problems in the supervision of intelligence activities throughout the division that you'll not have time for your own office administrative duties. Just be sure you read all the letters, memoranda, and other documents before you sign them.

Your two biggest headaches are going to be the planning and supervision of training of all intelligence agencies in the division, and counterintelligence, particularly censorship. Don't misunderstand that combat intelligence is not important, but with properly trained personnel in the units, combat intelligence will take care of itself provided that this training is continuous. You as G-2 make recommendations as to what you deem necessary to have well trained intelligence agen-

cies in the division, and after approval by the chief of staff these directives are published to the troops and then it's your duty as G-2 to see that they are carried out. It must be emphasized right here that the battalion and regimental intelligence sections are not the only intelligence agencies to be trained, but every individual in the division. Your intelligence sections (battalion and regimental) are not collecting agencies but are control points through which intelligence is disseminated. These sections will have all they can do to see that their subordinate units collect and forward intelligence, and if they don't, you will have to take the necessary action to correct that situation. Your man doing the fighting is the source of the bulk of your intelligence, and unless you see that he is trained as well in the collecting and forwarding of enemy information as he is in the handling of his rifle you won't have any intelligence to evaluate and disseminate. This point cannot be overemphasized. Be sure your individual soldier is trained to collect and forward everything pertaining to intelligence.

The training of regimental and battalion S-2's can be accomplished by means of a division school which should cover those subjects and which will be the means of producing uniform results throughout the division, such as uniform methods of rendering reports, writing messages, making S-2 estimates, and assisting in the professional training of the intelligence officers. A training program is issued by the division covering all phases of intelligence training of the individual soldier. This individual instruction must cover two things: first, observing, and second, reporting what is seen. This is best accomplished by the battalion S-2 himself or under his supervision, conducting small groups through a simple course of viewing objects laid before them for a few minutes, then covering the objects and having the individuals state what they observed. The list of articles should be increased as the individual becomes proficient, and finally the group of individuals should be trained in observation on terrain on which objects have been placed or over which objects are moving. This may seem a simple method of training in observation, but it is only by individual training that results will be accomplished. The reporting by individuals on their observations is conducted along with their training in observing, progressing from verbal reports to written messages.

The training of regimental and battalion intelligence sections should be left to the unit commanders, but the division should issue a directive as to what will be expected by a certain date; then tests should be held to determine the state of training. Regimental schools have been found to be a practical means of training intelligence sections.

Counterintelligence, particularly censorship of mail, is going to be a constant problem from the minute you leave the States. You'll have local regulations for the particular theater you are operating in, as well as the general regulations published by the War Department. You'll also have different base censors, each having ideas on how the censorship regulations should be interpreted. If at all possible, establish personal and frequent contacts with the censors who check your division's mail. Play ball with them, as they have a terrific task in the final checking of the mail and your friendly association with them will pay dividends. You as G-2 are responsible that proper censorship instruction is being given the troops. A thorough training program covering this subject will be necessary even before your division leaves the States, and the training will have to be continuous.

Training in security, particularly in regard to loose talk and the revealing of classified information in letters, is best accomplished by regular and frequent short talks by platoon or company commanders pointing out the reasons for censorship regulations. There are a few good training films showing the results of loose talk and leakage of information which can be used, but it is the constant repetition of cautioning against leakage of information that produces best results. Regardless of the training given, there will always be certain officers and enlisted men who will try to beat the censorship

regulations, but there is a very effective method of educating and training these individuals and that is to try them by courts-martial or discipline them under the 104AW. Officers are the worst offenders, and once they have lost one half of their month's pay they seem to have more respect for censorship regulations. The disciplinary action for these violations is not under your control, but they should be referred to G-1 for necessary action.

The other phases of counterintelligence will give you very little trouble provided you have made certain they have been thoroughly covered in training. The preparation of a counterintelligence plan is as essential during the training period as it is in combat. Particularly will this plan assist you in the preparation of your training program covering security.

Another obstacle which will confront you will be the personnel of your own section. Just because your predecessor left you excellent men, don't take it for granted that you'll always have them. You must be continually training replacements. You are going to have casualties, both battle and sickness, and you don't dare to be caught short. Get approval from your chief of staff to place on special duty with your section at least fifty percent above your authorized strength and maintain that fifty percent at all times. The personnel in your section will usually know of some one in the subordinate units who will qualify, but don't, unless it is an emergency, reach down and take a trained intelligence man away from a lower unit. This might be necessary under difficult combat conditions, but avoid it if possible. You'll find that if you'll keep an additional fifty percent under your direct training constantly, you'll not have any difficulty. In one combat division there was a complete turnover of G-2 enlisted personnel, with the exception of one man, within nine months. This turnover included the additional fifty percent. The junior private at the start of this nine months was master sergeant of the section at the end of the period, and a better chief clerk could not have been desired. It's all a matter of looking ahead, and planning so that you'll be able to have your section run smoothly.

The training of the enlisted personnel in your section is best accomplished by means of schools conducted for the newer members, and short refresher conferences by yourself or your assistant on the various phases of the section's duties. When a new man enters the section, it's a good plan to let him just observe for a few days before he is assigned as an assistant to an older member. Periodically every man should be changed from his regular assignment so he can take over any other job if necessary. There is no particular specialist needed in a G-2 section. Although it is an advantage to have trained draftsmen and stenographers, it is certainly not a necessity. You'll find that the average American soldier who really wants to better himself can become proficient in posting maps and recording and filing information, and can even learn to use the typewriter and substitute for your trained clerks in an emergency. There have been instances of enlisted men who were so enthusiastic about their assignment in the G-2 section that they even learned shorthand on their own time in order to be better equipped for their work. With proper care in the selection of your enlisted men and the proper training and inspiration on your part, it will rarely, if ever, be necessary to send a man back to his unit because of inefficiency. If you ever have to relieve any of your enlisted personnel, it will probably be because you were at fault in making your selection. The men in your section will work just as hard as you, if not harder, to be members of a general staff section. To them, it's an honor. If they become lax in their duties and seem to be losing interest, take an inventory of yourself, because no doubt they are reflecting your own attitude.

You'll always find that there is not the close association between the four general staff sections during the training periods that there is in combat. Your period of combat duty is very short in comparison to the training periods before and between actual combat periods. It is these periods of training that

will require you as G-2 to maintain that close cooperation with the other G's that exists when in action. The other three G's are busier than you, due to training and administrative details. They are more concerned with reorganization, resupply, and re-equipping for the next show, so the load of keeping in close contact with them will be practically up to you. Of course, you'll be concerned with the training of your intelligence sections and each individual in the subordinate units, but you'll have less staff relationship during these training and rest periods. These periods must be taken advantage of by yourself for further personal training and for utilizing every means at your disposal to keep up with the ever-changing situation and conditions in your particular theater, trying to anticipate where your division is to be employed next. Keeping situation maps and preparing reports and estimates of your general theater will afford you and the personnel in your section excellent training, and will also be the means of keeping your division commander and the balance of the staff informed as to the current situation. Use every means at your disposal—even if you have to procure these means by various methods—and every opportunity to perfect yourself in those duties which you can't farm out to members of your section.

You'll find the G-2 of your next higher headquarters a great fountain of information, advice, and assistance. Seek his advice and assistance very often; you'll find him most willing to help, and you in turn can often help him solve his problems. The closer association you have with your higher G-2 as well as with the S-2's in your units, the easier your work will be. Visit your next higher G-2 and your S-2's very frequently, gain their confidence and loyalty, and you'll find that in combat it will be much easier to procure the desired results. The more friendly and cooperative the contacts you make with those with whom you work, the easier will be the solutions of your problems. You'll never know all the answers nor will you find all the answers in the books; but never hesitate to seek advice, and have your S-2's feel free to consult you when necessary.

This article has been written primarily for new G-2's, but in the main the suggestions offered will apply to any new general staff officer.

To summarize, let's briefly list the recommendations:

a. Study, and constantly study, all manuals and documents relating to your duties.

b. Leave the office administration to your assistants. Don't make changes until you know what you are changing.

c. Provide for thorough intelligence training in the division; train particularly the individual soldier.

d. Cooperate with base censors on mail censorship.

e. Provide for trained replacements of your own training.

f. Use every means at your disposal to improve yourself and the members of your section.

g. Consult, cooperate with, and gain the confidence of those with whom you work.

Some commanders, during periods of stress, work themselves to a standstill and refuse all offers of food and drink and other creature comforts. At such times it may be the duty of the staff to insist tactfully that the commander is looked after properly and fed and rested. The care and maintenance of the commander is sometimes a difficult task.

—From an article in *The Tank* (Great Britain)

"Check List" for Disposition of Personal Effects and Baggage Overseas

MAJOR GERALD A. SMITH, *Infantry*
Instructor, Command and General Staff School

THE following notes indicate the duties and responsibilities of the officers and agencies concerned with the disposition of personal effects and baggage. The letters refer to those in the chart on the opposite page.

A. GRO (Graves Registration Officer), responsible for collecting effects of deceased personnel, removes GI property, makes inventory of the effects in triplicate, places effects in personal effects bag with original copy of inventory list, makes proper shipment of accumulated effects (in personal effects bags) in personal effects pouch properly sealed to nearest Base Section Graves Registration Service Officer, or such port of debarkation as the theater commander may direct, for transmission to Effects Bureau (U. S.). Money on body is removed, taken to local Finance Officer for conversion into check (U. S. dollars) payable to Effects Quartermaster, Army Effects Bureau, Kansas City Quartermaster Depot, Kansas City, Missouri. The check, any other funds or securities, and second copy of inventory list of personal effects are sent by air mail to Effects Quartermaster (U. S.). Third copy of inventory list is retained for GRO's file.

B. CO (Commanding Officer or designated subordinate) performs same duties as GRO in "A" above with respect to effects of deceased left in bivouac, except that effects are securely packed in a container suitable for water shipment and marked "Effects of: John A. Doe, Major, O-396421, 1st Infantry, DECEASED." Local debts due the deceased may be collected (if the situation permits), converted into check by the local Finance Officer, and included with other currency found in bivouac. NOTE: Only a Summary Court Officer is authorized by AW 112 to pay local undisputed creditors.

C. CO (Commanding Officer or designated subordinate) performs same functions as in "B" above, but must collect and dispose of all effects—on body and in bivouac.

D. CO (Commanding Officer or designated subordinate) performs same functions as in "C" above with the following exceptions: inventory list is prepared in triplicate, original enclosed with effects, copy mailed with check to Effects Quartermaster (U. S.), and the *third copy is filed in the organization records*; also, container of effects is marked "MISSING" (etc.) instead of "DECEASED."

E. CO (Commanding Officer or designated subordinate) should make every attempt to locate owner of "lost" or "mislaid" baggage (through AG channels within the theater), and arrange for return of property to owner. Same is true for baggage left through "forced abandonment" (owner suddenly transferred and may have to leave some property in rear areas). If not possible to return baggage to owner overseas, it should be inventoried, GI property removed, currency converted to check, property securely packed and marked in a suitable container, and sent to army railhead, truckhead, or depot for transmission to Effects Bureau, Kansas City Quartermaster Depot, Kansas City, Missouri. Any available information concerning the owner and his relatives should be furnished the Effects Quartermaster (U. S.) to assist in disposition of the property. In the case of property deposited and awaiting shipment to a designated individual within the U. S., security of packaging, and clarity as well as sufficiency of address, should be checked carefully, and then container forwarded to the appropriate port of embarkation for shipment to the U. S.

F. SCO (Summary Court Officer) need only enter the procedure for disposition of effects when it is necessary to pay local undisputed creditors of the deceased. In this case, a report to The Adjutant General of

Officers and Agencies Concerned with the Disposition of Personal Effects and Baggage	SOURCES OF PERSONAL EFFECTS AND BAGGAGE TO BE DISPOSED					
	DECEASED PERSONNEL				MISSING PERSONNEL	PERSONAL BAGGAGE
	Battle Casualties			*Non-battle Casualty*	*"Missing" (M)*	*Lost*
	Killed in Action (KIA)		*Died off Battle-field*		*"Missing in Action" (MIA)*	*"Forced Abandonment"*
	Effects on Body	*Effects in Bivouac*			*"Prisoner of Enemy" (POW)*	*Deposited for Shipment to U. S.*
GRO—Graves Registration Officer	A					
CO—Commanding Officer or designated subordinate		B	C	C	D	E
SCO—Summary Court Officer	F	F	F	F		
FO—Finance Officer	G	G	G	G	G	
Army Rhd or Trk Hd	H	H	H	H	H	H
Army QM Class II or IV Depot	I	I	I	I	I	I
Com Z Adv QM Class II or IV Depot	I	I	I	I	I	I
Com Z Base QM Depot (Effects Section)	I	I	I	I	I	I
Port of Embarkation (Theater of Opns)	J	J	J	J	J	J
Port of Debarkation (United States)	K	K	K	K	K	K
Effects Bureau, KC QM Depot, KC, Missouri	L	L	L	L	L	L
TAG, WD, Wash., D. C.	M	M	M	M	M	M

settlements made is required (copy to Effects Quartermaster, Kansas City Depot). It is advisable, situation permitting, to have the local SCO handle all money matters (collection of debts, conversion of currency), as well as to prepare and certify the inventory of effects. NOTE: WD Circular No. 118, 22 March 44, authorizes SCO to make direct disposition of effects (where death occurs outside U. S.) to persons legally entitled to receive effects under AW 112 when they are resident within the country in which death occurred, in territories or possessions of the United States, or in neutral or allied countries.

G. FO (Finance Officer) converts funds (including foreign currency other than souvenir money) brought to him by any of the foregoing officers. Check should be made

out to himself, and in the presence of the other officer should be endorsed "Pay only to the order of the Effects Quartermaster, Army Effects Bureau, Kansas City Quartermaster Depot, Kansas City, Missouri." Check should be made payable in U. S. currency.

H. Army Rhd or Trk Hd (railhead or truckhead) should accept any personal effects or baggage delivered to it by proper authority and transmit same on returning transportation to a designated Army Quartermaster Depot. Containers accepted should be checked for proper and adequate marking as indicated in "A," "B," "C," "D," and "E" above. An adequate record of all effects and baggage received and shipped to the rear should be maintained as a permanent file.

I. QM (Quartermaster) installations in both the combat and communications zone should accept containers of personal effects and baggage from forward units and installations and from local units and installations (as designated) for transmission to the appropriate port of embarkation (theater). A careful check should be made of the marking of all containers. Any evidence of tampering or pilfering of effects should be immediately investigated and a new inventory made by responsible officer or officers. Shortages should be reported to higher headquarters in order that a thorough investigation may be made and the necessary report made to the War Department.

J. Port of embarkation (theater) is responsible for loading personal effects and baggage which is properly packed and marked in a safe place on ships for return to the U. S. In case of evidence of pilferage, an inventory is made and a report submitted to higher headquarters. A careful record of all containers received and shipped should be made and filed as a permanent record. Port of debarkation (U. S.) should be notified of the quantity and classification of effects and baggage shipped.

K. Port of debarkation (U. S) is responsible for receiving personal effects and baggage, checking for evidence of tampering (inventory, investigation, and report made as necessary), and transmitting such containers to the Effects Bureau, Kansas City Quartermaster Depot, Kansas City, Missouri (normally by carload lots). Baggage addressed for shipment to designated individuals within the U. S. is forwarded by commercial means.

L. The Effects Bureau, upon receipt of personal effects, checks the enclosed inventory, censors papers and other property for military information and obscene literature, withdraws GI property, and packs effects for shipment to a "distributee" (AW 112 in case of deceased personnel) or to a "bailee" who holds property of missing persons pending their return to claim it. Checks received through the mail are deposited and later forwarded to the "distributee" or "bailee." When a suitable "bailee" or "distributee" has been determined, effects are forwarded, a receipt is obtained, and a final report of the transaction is made to The Adjutant General, Washington, D. C. Effects or baggage of unidentified personnel is held for a minimum of six months before disposition of items of other than intrinsic value is made by public sale, after which all money and valuable keepsakes (medals, etc.) are forwarded to The Adjutant General.

M. TAG (The Adjutant General) receives a final report of the disposition of all personal effects of deceased and missing members of the Army and civilians subject to military law serving with the Army overseas, and maintains a permanent file on all such cases. Money and items of intrinsic value of unidentified personnel received from the Effects Quartermaster (SCO under AW 112) are held for an additional length of time and if not claimed are turned over to the Old Soldiers' Home.

Jungle Warfare

Digested at the Command and General Staff School from an article in *The Marine Corps Gazette* July 1944.

A distillation of the best knowledge of jungle warfare gained by Marines who have fought in the Philippines, Guadalcanal, New Georgia, Bougainville, and New Britain. By Marine Corps Schools, Quantico, Virginia.

IT is important to realize that distance in the jungle does not necessarily bear any relationship to time. In temperate zones on decent roads, troops can be expected to maintain a rate of two to three miles an hour. In the jungle, the rate will rarely exceed one mile per hour. In the case of a battalion moving over a poor trail, the rate may be reduced to one-half mile per hour.

Jungle trails will usually restrict the formation to a column of files. Advance and rear guards are detailed. To facilitate control, to improve security measures, and as an aid to more rapid movement into battle, elements in the column move as units, as compactly as possible. Connecting files maintain liaison between the elements of the column and between the main body of the column and the advance and rear guards. It is not the duty of the advance and rear guards to send connecting files to the main body. The main body sends these files out. Advance and rear guards should be changed daily. Within them there should be rotation of assignment. The same squad should not be kept in the point for more than two hours, for point duty is very demanding.

Flank patrols must be sent out when the situation dictates it and when the terrain permits. When a rapid movement is being made in an effort to gain surprise, it would not be advisable to send out flank patrols if they have to cut. The pace of the column would be slowed and the noise made by cutting would alert the enemy.

All lateral trails must be investigated for several hundred yards and covered by combat patrols until the column has cleared them. These combat patrols are sent out from the advance guard. After the column has cleared the lateral trails, the combat patrols rejoin the column, falling in at the rear. They rejoin the advance guard at the next hourly or periodic halt.

Distance between men on the trail varies from one to three yards. The column commander may march in any position; he is situated to deal quickly with any situation. He should always have with him his operations officer and one runner from each element of the column in addition to several runners from the headquarters group.

Radio communication within the column may or may not be permitted. Usually it will not be. Until ultra-portables with dependable performance characteristics have been combat tested, runners must be considered the primary means of communication.

It is the duty of all to observe strict trail discipline. No talking can be permitted except in whispers. The commands to halt the column will in all cases be given by an officer.

Trail discipline is always essential. In the jungle, this is particularly so, for there the enemy is afforded opportunities for ambush that do not exist under normal conditions of combat. The following points are particularly important.

1. Prescribed distances must be maintained on a jungle trail. The distance between men and between elements of a column will be less than under normal conditions. Jungle trails are narrow, are often confined by walls of brush on both sides, and are tortuous. Therefore, if contact is to be maintained, all members of the column must be alert to prevent "accordioning."

2. Loud talking is strictly prohibited.

3. Men leave the trail and stand motionless on the approach of aircraft.

4. At halts, men may relax physically. They can never afford to relax mentally.

5. If men fall out, they must be left behind.

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The speed of the column will be dictated by the terrain, the heat, humidity, and the condition of the trail, and must be adjusted to the speed that can be made by the men of the weapons platoon who are carrying machine guns, mortars, and heavy ammunition loads. If this procedure is followed, there will be few if any stragglers.

On some terrain, the column may be able to march about forty or forty-five minutes and to rest for the balance of the hour. Under more trying conditions, the column may march for fifteen minutes and then halt to rest for ten minutes.

All hands should be provided with salt tablets or ordinary table salt before the march starts. Personnel will be instructed by doctors and corpsmen how often salt is to be taken. Halezone tablets or individual CDC units for the purification of water are also distributed every time troops water.

All weapons must be thoroughly cleaned and oiled liberally, and all ammunition inspected before the march starts. Oil soaked rags, dark in color, that can be removed with a quick jerk should be wrapped around all operating mechanisms to protect against humidity and the mud that will clog mechanisms if the men fall, as they frequently do. All rifles and carbines are carried loaded and locked. BAR's and submachine guns are carried with magazines in, bolts forward. In the advance and rear guard, weapons are carried ready for instant use. In the main body they may be slung. Except in the point, bayonets are not fixed during the march, as they catch in vines and bushes.

During a jungle march, two meals are eaten daily, morning and evening. No noon meal is eaten, though a rest period of about forty-five minutes may profitably be ordered at about halfway mark. During this period, men should be encouraged to drink chocolate, lemonade, or bouillon prepared from powder in the "K" or "J" ration. All these drinks are swiftly assimilated by the body, and are palatable and refreshing.

Columns on the march are halted only by the order of an officer. The use of the phrase "hold it up" must not be permitted.

When the column makes any halt, all hands immediately leave the trail and move into the bush on alternate sides, facing out in positions of readiness. If the halt is a periodic one of ten to twenty minutes' duration, security must be pushed out on either side of the trail. The remainder of the men may relax and should be encouraged to do so, and for those not on security, permission should be given to lie down or to rest against logs and stumps. During rest periods men must keep one hand on their weapons at all times. Periodic halts should be called when it is the approximate time for such halts and when the larger portion of the column is on defensible ground.

A bivouac site must first be defensible and second be near fresh water. In the jungle, neither requirement will be hard to satisfy. High ground is desirable for a bivouac, not only because it is defensible but because it is freer from flies, mosquitoes, and other insects than is low ground. Also, it is better drained and cooler.

A native village should never be selected as a bivouac site. This precaution must be taken not only because the enemy may have the village spotted but because there may be unfriendly villagers present. Also, the ground in the vicinity of native villages is often fouled, and our troops may contact dysentery or other diseases if a night is spent under such conditions.

The halt for the night must be made in time to permit the following:

1. A brief reconnaissance of the bivouac area and assignment of units to sectors for all-around defense.

2. Movement of the troops into the assigned sectors.

3. Clearing of limited field of fire for automatic weapons.

4. Preparation of hasty all-around defense. Digging of foxholes, siting of machine guns and automatic weapons, and preparation of shallow emplacements.

5. Excavation of straddle trenches.

6. Preparation and consumption of a meal.

7. Completion of arrangements for sleeping. One-third of the men should prepare their

food while another third is busy in preparation of their positions and the remaining third is on security. On completion of tasks, details are rotated within squads.

It has been found that a battalion will require approximately three hours to make these arrangements. Accordingly, the halt for the night will have to be some time between 1430 and 1600.

After the area of the bivouac has been selected and the troops moved in to assigned sectors, the column commander will usually hold a conference, at which time the password for the night and the plans and orders of march for the following day are issued. Meantime, platoon leaders check their security, the progress of the foxholes and emplacements, and the progress of cooking.

Each platoon must have a designated straddle trench. It may be desirable for each squad to have one. To the extent humanly possible all calls of nature must be attended to before darkness. If a man is required to answer a call of nature after dark, he should dig a small hole by his foxhole.

The smoking lamp is out and all fires are extinguished at sunset. Cooking is done with heat tabs, Sterno, or similar smokeless preparations.

Mortars must be set up within the bivouac area so that they can fire barrages in support of the defense. Mortar crews maintain the same watch schedule as is prescribed for other troops, that is, one third of the crew of each mortar must be awake during darkness and all crew members must be alerted at sunset and again prior to dawn.

The rigors of jungle campaigning, the heat, humidity, and dietary deficiencies all tend to cause loss of weight and to lower resistance progressively. These conditions affect the combat efficiency of a command, and are the reasons that periods of rehabilitation are necessary after several months of active operations in the jungle.

Our most persistent enemy in the jungle is neither the climate nor the Japanese, but the malaria-carrying mosquitoes known as anopheles. Malaria has inflicted on our troops several times the number of casualties that have been inflicted by the bullets or bombs of the Japanese.

The incidence of malaria can be decreased to a great extent if all personnel are indoctrinated in the subject of "Malaria discipline."

Thousands of man days are lost in jungle campaigns due to gastro-enteritis, dysentery, and other stomach and bowel disorders. When gastro-enteritis sweeps through a unit, it puts every officer and man on his back. On one occasion a company had one hundred men out of 140, or over seventy percent, completely knocked out by gastro-enteritis for a period of five days. This disease is spread by man's carelessness. It is the direct result of failure to observe elementary sanitary requirements relating to disposal of human waste and garbage, sterilization of mess gear, and observance of the very commonsense sanitary regulations covering the preparation and serving of food.

No food should be handled with the hands when eating implements are available. Mess gear should be sterilized both before and after using. After sterilization following a meal, mess gear should be hung up to dry in the sun and not crammed back inside a dirty pack. Obviously, it is impossible for troops who are engaged to comply with these regulations during actual combat, but troops in any combat theater never spend as much as ten percent of the time in fighting, and during the remaining ninety percent of the time, they must comply with elementary sanitary requirements.

Tropical ulcers are common afflictions in jungle climates. They often start from small skin cuts made by coral or thorns. All such minor cuts must be immediately treated. Several applications of sulfanilamide powder may be necessary before the cut heals. These cuts should be covered to protect them from dirt. Small pieces of adhesive, or the commercial "Band Aid," are satisfactory for this. If such cuts are permitted to go unattended, they will usually become a focus of infection, the affected area will increase in size, and serious complications are likely to follow.

Trench mouth is sometimes contracted in the jungle. If not promptly treated, it will

result in loosening of the teeth and eventual loss of them. Any unusual soreness or tenderness of the gums should be reported to the medical personnel.

Men must bathe daily in the sea or in fresh water when possible. During combat they will have no chance to do this, but as soon as they have a chance, they must bathe thoroughly. It will be found a good idea to order sea bathing by platoons, for some men are so lazy and irresponsible that they consider it too much "trouble" to take frequent baths.

Clothes must be washed when possible. If there is a limited supply of fresh water and soap, men must be required to keep underclothes and socks clean. Of course, if they have the opportunity, they should wash their outer garments as well. Boiling clothes will kill all bugs and will diminish skin infections. If conditions permit, clothes should be boiled twice a week.

Hair should be clipped short before going into a jungle operation. The growth of beards should be discouraged. It is true that a luxuriant beard lends an air of distinction to the wearer, but the simple fact is that in the jungle where they cannot receive care, beards are not hygienic. Added to this is the fact that beards complicate the problem of the surgeon enormously in case the wearer suffers a face wound.

All water is treated. On the march, halezone or CDC tablets are issued in the rate of one per canteen of water. It takes about twenty minutes for halezone or CDC to dissolve. In camp, all water is chlorinated and lyster bags used. Contaminated water is a primary source of dysentery and other intestinal disorders.

After movement into the bivouac area, doctors and corpsmen examine and treat those who have foot complaints, coral cuts, or who have been slashed by vines. At this time the daily atabrine is issued and halezone or CDC and salt tablets for the following day's march distributed to squad leaders.

The password for the night is relayed to all hands. There is an unlimited variety of phrases that could be chosen, for the Japanese have difficulty with our letters "L" and "V."

During the night one-third of the command must stay awake. The platoon commander, the platoon sergeant, and the platoon guide is each awake and alert for about four hours.

During the night, strict fire discipline must be maintained. There will be no firing, even at occasional snipers. Firing is only justified when an actual attack is being made on the position.

Approximately one hour of daylight will be needed to get moving in the morning. Men prepare and eat breakfast, check the adjustment of their equipment, and move off on order. Security detachments are the last to move out of the area.

Security in jungle warfare is continuous. It never lapses. In jungle warfare, there is no "front." It must always be considered that contact is imminent and that the enemy may appear from any direction.

When planes approach the vicinity of the column, all hands halt, step to the side of the trail, and stand motionless in the shadows. No one looks up. If these precautions are observed, it will be impossible for air observers to see the column regardless of the altitude or speed at which they are flying.

Security in the bivouac area is assured by a number of listening posts established outside of the defensive set-up. The men on these posts should remove their helmets. They may occupy two or three-man foxholes. Either the two or the three-man foxhole is preferable to a one-man foxhole. Men may sleep in or immediately adjacent to foxholes.

Whenever possible, all personnel should sleep off the ground. This will not be possible when troops are engaged, but when in rear areas, it should be a standard rule. The army jungle hammock is an excellent piece of equipment, will keep the sleeper off the ground, dry, and will protect him against mosquitoes. If no jungle hammocks are available, platforms should be built several inches above the ground. These can be covered with jungle ferns and leaves.

The Control of Supplies

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STOCK control was conceived in January 1943. It was put into official operation with a complete inventory of stocks taken at all posts, camps, and stations in the continental United States as of 29 May of the same year. Thereafter a thorough educational campaign was conducted in order to instruct post, camp, and station personnel in establishing proper stock levels. In addition, it was necessary to develop ways and means of disposing of the large stocks of supplies which were rendered excess to the station's needs because of the new methods employed.

In the meantime, the services and depots were developing methods of managing stocks at depots, both for zone of the interior and overseas distribution. This included methods developed by the various technical services for making timely distribution of supplies from production which had to be stored prior to issue to troops, stations, or overseas commands.

The chief of a technical service under the direct system of supply has the responsibility of making supplies available to using units. It is his responsibility to develop the requirements, to make distribution to depots where the supplies are closest to the point where they are to be used, and finally, to see that the correct amount of supplies is located in station stocks and available for direct issue to troops. In order to exercise this responsibility, the chief of technical service was given the authority to review and approve stock levels established by the various stations. The supervision over the methods of establishing these levels and the interior administrative actions of posting the stock record cards were made the responsibility of the Service Commands. The station supply officer, being the man best acquainted with the local supply situation, initially must set the station levels which will later be reviewed by a representative of the chief of technical service.

In handling excesses it was necessary to get the quantitative amount on the depot records as soon as possible. By having the total stockage reflected on depot records and thence assembled centrally in the Office of the Chief of Service, complete and accurate information as to stocks on hand nationally was available. In this way, the chief of technical service was able to assemble data on stocks available for issue, all of which were completely under his control. The method used was the submission of excess reports periodically to the supplying depot; in turn, the supplying depot furnished the station disposition instructions concerning the shipment of the excesses to the depot or to some other depot in need of the supplies.

In developing the requirements to be produced, the method originally used was one of computing from the troop basis and extending Tables of Organization and Equipment so that the total over-all Army requirements for equipping all units in the troop basis could be effected initially. In addition, there was an allocation of supplies made to fill the pipeline, in other words, for distribution purposes. Furthermore, maintenance requirements for the replacement of equipment completely worn out had to be included in the requirements to be computed. All these requirements were totaled and became the Army Supply Program.

This method of computation of requirements was satisfactory from the viewpoint of initially equipping a large and expanding Army. Due to the fact that the Army is now completely supplied or nearly so, it is necessary to compute requirements based on the need to replace equipment and to anticipate operational requirements. This necessitates a complete knowledge of troops in being (troop basis), their deployment and use, prospective operations, and past issues from which experience data can be developed in order to project issues into the future. This system of projecting requirements is known as supply control.

It may be noted that the terms stock and

supply control have both been used in this discussion. The term "control" is used in this sense to indicate an adequate control of the supplies either to be produced or actually in being. Supply control envisages the control of supplies from the establishment of the requirements to ultimate user. Stock control encompasses only the complete knowledge of supplies in being, in other words, on hand and available for use in all echelons of supply.

In order to control anything, it is necessary to have a basic knowledge of certain facts. To control supplies, these facts are:

1. The amount on hand.

2. The amount "due out."

3. The amount "due in" from production or on requisition.

4. The amount required.

This leads to a very simple quotation: "Know what you need. Know what you have. Get, or get rid of, the difference."

It is a comparatively simple matter in any echelon of supply, or nationally, to know what you have. It only involves maintaining accurate and complete records and assembling the information at one central control point. It is further comparatively easy to assemble data concerning "dues out" which are back orders or promises to pay. The "dues in" can be obtained locally from information posted on stock record cards as to requisitions placed on which the supplies have not been received. Nationally, the information can be computed in accordance with procurement schedules and contracts in force.

The big question is to know what you *need.* In war this knowledge is hard to come by and is often problematical. The utilization of the well-known crystal ball can hardly be considered a satisfactory method of determining needs. Something more is required. Projection of needs then becomes the most important consideration of control; of supply control for the Army as a whole, of stock control for a given overseas command, particular distribution depot, or a given post, camp, or station. The best method found to date of computing the needs of a particular supply echelon is the establishment of a definite level of supply authorized or required to be on hand. This level of supply is a command decision made by the War Department for the Army as a whole, or a given theater of operations, or for the depot and station echelon. The requirement then exists for the commander concerned to change this level of supply, expressed in days, into a quantitative amount and to establish a system in order to maintain this amount at the prescribed level.

The method of estimating the anticipated need for the period of time prescribed in the future can best be achieved by referring to past issue experience. This past experience, of course, must be evaluated for troop strength, troop composition, the operational situation, and even seasonal requirements. Utilizing past issue experience modified in accordance with the foregoing, a definite figure for a day of supply for a particular supply point can be worked out. This may be accurate, it may be faulty; but it is the best judgment of the individual making the estimate in an effort to have on hand sufficient, but not too many, supplies.

Once days of supply have been converted to a quantitative amount for each item stocked, the next problem is one of ordering (requisitioning) to maintain this amount. Figure 1 represents this method of ordering in a hypothetical theater. The War Department has prescribed a minimum level of forty-five days. This minimum level is designed to be on hand as a reserve in the theater, to be used in case of emergency. The emergency involved may only be that of running out of working stock or it may be the re-equipping of a complete unit due to operational losses. Above the minimum level is an operating level, likewise prescribed by the War Department, of thirty days. This operating level is the working stock. It means that at the beginning of the month there should be seventy-five days of supply on hand in the theater, and at the end of the month, just before the arrival of the next shipment, there should be forty-six days of supply on hand. The stock level then fluctuates between the minimum level of forty-five days and the maximum level of seventy-five days. In order to maintain stock in this balance, it is obvious

that it will be necessary to requisition at least once a month. It is assumed that it takes, for the theater involved, ninety days for a requisition to be made out and supplies returned to the theater. With airmail, frequent convoys, expeditious processing of requisitions by ports of embarkation and depots, and fast voyages, it would appear that ninety days is somewhat long. Remember that this is a normal replenishment requisition. It is not a special cablegram requiring expeditious action whereby the necessary supplies might even be flown to the theater. Time is important, and ample time must be given to all requisitioning activities. This lead time has been termed in Army parlance "order and shipping time." The sum of the maximum level and the "order and shipping time" is known as the "requisitioning objective."

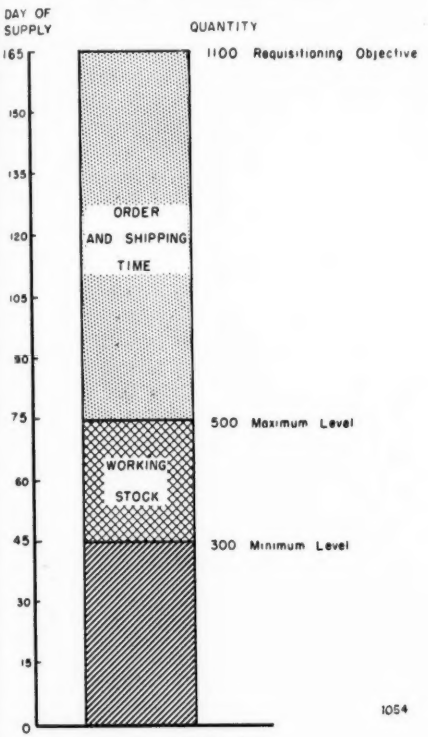

FIGURE 1.

The amounts expressed in days of supply are always translated into a quantitative amount which is also shown on the figure. This conversion is based on the fact that approximately 200 of the item in question will be issued every month, giving the theater a requisitioning objective of 1100. There, in plain sight, are the theater's needs. The next step is one of determining the amount on hand and due in, which are assets, and the amount due out, which is a liability, and making an arithmetical computation to secure the amount which must be ordered. Utilizing the figures shown, let us assume that the amount on hand is 275, that due to circumstances one depot in the theater is out of stock and had a due out of 50, and that previous requisitions placed, for which the supplies have not been received, amount to 560. This may be expressed in the formula: $1100 - (275 + 560 - 50) = 315$. So 315 are requisitioned. Sooner or later the amounts previously requisitioned will arrive in the theater and become stocks available for issue, and in approximately three months the 315 just ordered will also arrive.

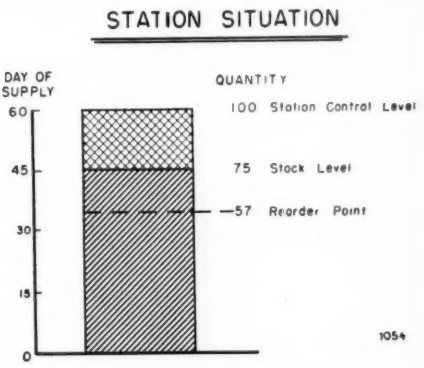

FIGURE 2.

Figure 2 represents the method used in controlling stocks at posts, camps, and stations. This control has been simplified somewhat over the method outlined above. This

simplification is possible because of the nearness of depots in the continental United States to stations, together with a fast, assured transportation system.

The stock level is an objective stockage where stocks vary plus or minus from an average amount so that, in the long run, a forty-five day level is maintained. This is done by arbitrarily utilizing an order and shipping time of fifteen days, which is an average time interval for supplies to be received at a station from depots in the continental United States. This makes for complete uniformity in operation in all services at all stations. The total amount authorized to be on hand and on order has been dubbed a "station control level," which is exactly similar to the requisitioning objective for an overseas theater. One additional wrinkle has been added to the station supply procedure to prevent ordering of minutial amounts. This is the re-order point which is set quantitatively at three-fourths of the stock level. If issues are made in accordance with expectancy, invariably stocks should fall below the re-order point. On occasion, however, issues are slight on a particular item and the re-order point is used to prevent one or two of an item being requisitioned when normally ten or twenty would be the customary amount. In this case, days of supply are quantitatively extended based on the assumption that past issue experience projected into the future indicates that seventy-five is the required amount for a forty-five day stock level. The station control level of sixty days is therefore one hundred. In computing the amount to be requisitioned from a depot on the requisitioning date, it is only necessary to determine the amount on hand, due in, and due out, and subtract from the station control level.

A similar arrangement is used at depots where a depot stock level is computed in order to estimate the requirements of a given depot area. To this amount is added the order and shipping time factor required to accomplish distribution from a manufacturer to the depot, the total of the two becoming the depot control level.

These, then, are the principles for the control of supplies put in very simple language. The work involved is one of tremendous application because of the large number of supplies stocked by the Army. It takes people to manage such a system, it takes judgment, and it takes good hard work.

Strabismus in the Army

IN an article entitled "Strabismus in the Army," published in the July issue of *The Military Surgeon*, Major Harry D. Rosenbaum, Medical Corps, discusses his work with "cross-eyed" soldiers.

Before the present emergency, due to physical standards, strabismus (cross-eyes) was rarely seen in the Army. However, since January 1941, this type of soldier has been seen with increasing frequency in most branches of the Service Forces. Though the number is not great, it has been found that approximately one percent of inductees accepted for service were diagnosed as having an appreciable amount of strabismus.

In the rehabilitation of these individuals, it was noted that the psychological changes so often associated with strabismus were evident in many of these soldiers; they were shy, almost hesitant, and had a distinct feeling of inferiority. With the idea of benefiting the Army in general, and the soldier in particular, many of these soldiers were operated upon. The operation consists of readjusting or resetting the muscles of the eyeball to enable the visual axes of the two eyes to approximate parallelism.

It was found that the soldiers not only looked better, but their value to the Army was greatly increased, as they were placed on the same basis as their normal-appearing "buddies." This enabled many of these men to get more desirable positions, and some were later sent to Officer Candidate School.

The Chemical Specialist on the Staff

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THE chemical specialist, that is, the officer of the Chemical Warfare Service found on all high staffs, is somewhat of a mystery to many in the Army. Because gas warfare has not started, many have said—or thought—that he is "surplus" to a large extent. This article will show how fallacious such belief is and how now, today, the Chemical Officer can pay his way, and pay it as a chemical specialist.

The beginning of poison gas warfare on 22 April 1915 found the Allies completely unprepared. They had no defensive means whatever for their troops, much less a gas officer or a chemical specialist on unit staffs. These specialists had to be trained and assigned as rapidly as possible so that units of various sizes would have a technical expert available to teach troops effective gas defense and to supervise and advise on all gas matters.

After World War I the United States Army established the Chemical Warfare Service as a permanent part of the military establishment, and included in the organizational tables of units of the size of a division, equivalent, or higher units, an officer of the Chemical Warfare Service, known as the Chemical Officer. To provide specialists in lower echelons it was provided that selected officers and noncommissioned officers of the various arms and services be specially trained in chemical warfare matters. These officers and noncoms are called Unit Gas Officers (UGO's) and gas noncommissioned officers (gas noncoms) respectively.

The remainder of this article will be limited to a discussion of the Chemical Officer's functions and his difficulties.

Field Manual 101-5 (The Staff and Combat Orders), paragraph 25, lists in detail the duties of the Chemical Officer and names him as a member of the special staff. We find therein a total of eleven separate and distinct duties.

In the zone of the interior many of the listed duties of the Chemical Officer are not of importance. For instance there is no captured chemical equipment to examine and no chemical intelligence work to perform. As a matter of fact, since chemicals, at least in the sense of poison gas, have not been used by our enemies since our entry into war, and since our announced political policy is to let the enemy initiate lethal gas use and merely to retaliate, there is a strong tendency to push chemical training into the background, to carry out merely the minimum chemical defense training called for in the mobilization training programs, and to disregard almost completely the valuable offensive means that lethal gas can provide.

Another factor which tends to make the Chemical Officer's life a hard one is that many officers associate the Chemical Warfare Service solely with poison gas and forget that we have two additional potent chemical agents, screening smokes and incendiaries, and chemical weapons such as the 4.2 chemical mortar.

The Chemical Officer has many things to do if he is to be of the greatest possible value to his unit. In order to do his job properly, he must first be cooperative and helpful. After all, he is a staff officer and not a commander, and must follow the lines of command. There is one pitfall that he must avoid, and that is never to allow himself to become just another assistant G-3 or G-2 or G-4. When time permits his being of use to other staff sections he should be ready and willing to do so, but he is first and foremost a Chemical Officer and just a little investigation will usually uncover enough chemical work to keep him busy most of the time.

Of what use can the Chemical Officer be to the staff? In a newly activated unit he will have many schools to run in order to train not only the minimum number of gas officers and gas noncoms but to provide a good surplus which will allow for weeding out the unfit and in addition provide a cushion for transfers and promotions of his unit specialists. This, together with supply of chemical protective equipment to the men and constant

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supervision and checking of the results of gas training in the lower units, will bring him into close contact with many officers throughout the division. In doing all this he can be of great value to G-3 regarding training and to G-1 concerning personnel.

To G-4 the Chemical Officer can be of assistance in first keeping his own supplies well in hand and by foreseeing his future requirements in good time, and further in keeping constant check on chemical supplies and requirements in the lower units.

G-2 can make good use of the Chemical Officer's abilities. During the training of a division, G-2 is interested in securing thoroughly trained, reliable intelligence units which, under any condition, get the truth, get it fast, and get it right the first time. It is highly important that all intelligence personnel be thoroughly grounded in all known poison gases so that in combat, if gas is reported, it is gas and not just a new kind of screening smoke or the smell of bursting high explosive. G-2, if reasonably verified reports of gas use come in, preferably substantiated by samples of munitions or the gas itself, will know what to do. The Chemical Officer should be given the information and samples and can then give immediate advice and forward the material for proper technical examination.

Intelligence personnel should know all of the many gas detection means available to our Army, and not only be familiar with their routine usage but with their peculiarities. There was a healthy gas scare on the beaches of Salerno during the early phases because gas detector paint turned red on vehicles. The paint turns red on exposure to liquid blister gas. Everyone around there knew that, but they didn't know that it also turns red under excessive heat, and it was on badly overheated vehicles that the paint had changed color.

This analysis and technical investigation is an important matter. If the enemy starts gas warfare, he may well have gas and munitions that are new to us, and the rapid transmittal of samples to the proper place, the chemical laboratory company, can save us many casualties. Rapid, accurate analysis will tell us exactly what we are dealing with, and knowledge is half the battle in devising countermeasures. The Chemical Officer will know where the laboratory companies are located and how to reach them most quickly.

The perennial worries of G-4 about supply can be decreased by intelligent cooperation between himself and the Chemical Officer. Chemical supply is just one more logistics headache. Initially, in a new unit, large stocks of masks and other protective equipment must be secured, and after that there will be the problem of maintenance stockages and the repair and salvage of damaged equipment. The Chemical Officer can and should attend to these details.

Later, in the field, there is the problem of continual stockage of fairly sizeable loads of special decontaminating materials and equipment, as well as reserves of masks and other protective devices and materials. That brings on its own special headache, for such materials and equipment must always be ready and yet may never be used. The Chemical Officer must continually supervise these supplies and make sure that they are not discarded or in unserviceable condition.

Many members of the special staff can find sound advice and assistance available in the Chemical Officer's section—the surgeon, for treatment of gas casualties, the ordnance officer for handling of chemical shell, the artillery officer for proper use of chemical shell, and the engineer for advice on purifying water that may become contaminated with gas. All of them can gain from reasonable cooperation with the Chemical Officer.

The Chemical Officer's primary duty, to be the adviser to the commander and his staff on all chemical matters, is becoming increasingly important. Not only are the air forces carrying more and more incendiaries but they are also using more and more screening smokes. The ground forces have also stepped up smoke usage considerably. In rear areas, ports and similar vital supply localities within reach of enemy bombers need area smoke screens and the local Chemical Officer can advise on best usage of smoke-producing means.

Another factor emphasizes the Chemical Officer's value, especially with the ground combat division. That factor is the introduction into combat of the chemical battalion armed with the 4.2-inch chemical mortar. Last July in Sicily marked their introduction, and they have been used continuously ever since. Also the South Pacific now knows the battalion and its mortar at first hand. The division, corps, and army Chemical Officers know the battalion and its capabilities and can best advise on its proper usage. In North Africa, before Sicily, the Theater Chemical Officer organized a team of officers from his staff who went from division to division making sure that the capabilities of the battalion were fully understood. When these battalions are present, the Chemical Officer has the additional responsibility of insuring supply of shell for the mortar. Both white phosphorus and high explosive shell must be available, in the right percentages.

Outside of the staff, the commanders of subordinate units can and do find the Chemical Officer's talents of value. First there is the proper training of their commands in gas defense. That is something much easier said than done, and it must be done. Besides that, in all states of training the use of smoke by combat troops can and should be emphasized. In fact, it is difficult to overemphasize proper smoke use. Smoke properly used can reduce casualties. Improperly used it can confound our own men and help lose an action. Constant use of smoke in tactical problems both in unit training and in all stages of combined training will give our officers and men a familiarity and an expertness in proper smoke usage, and that is something that all the lectures and all the books can never do. Besides smoke and gas training, incendiaries both in usage and defense should be covered at least briefly.

The Chemical Officer, working with unit commanders, can secure the necessary smoke matériel and advise on its best use. Also the unit commanders, with the approval of higher authority and the cooperation of the Chemical Officer, can carry on training in the offensive use of poison gas. It probably will not be possible to carry on extended training, but at least we can teach the basic principles so that if gas warfare starts our men can use gas on the enemy without its proving a boomerang.

Now that we have briefly discussed what the Chemical Officer can do for the staff and the units, what can they do for him? A fair hearing is all that the Chemical Officer asks, and then cooperation within reasonable limits. We have a saying in CWS that the Chemical Officer must be a salesman. He must prove that he knows his business and convince his brother officers that gas warfare is an ever-present threat. All we can do is to plan and prepare and be ready if it starts. Insufficient chemical training will not be satisfactory if gas is used.

In a few paragraphs we have tried to cover the reasons for the existence of this specialist, the Chemical Officer. There is one question that he cannot answer for you. That is whether the enemy will use gas, and if he does, when he will start. You can get a thousand arguments within the Chemical Warfare Service, and outside of it, on that question, and almost as many opinions. And opinions they must be. The only answer will be given by the enemy.

We must remember two things. The first is that gas is a proven effective weapon in warfare and that it is therefore an ever-present threat. Our enemies, both the German and the Jap, have plentiful stocks of gas and the means to use it, and, knowing its capabilities, have by no means discarded it. The second is that the closer we get to the enemy's homeland the greater his ability to use gas. We must try to avoid a repetition of the last war when we entered the conflict two years after gas was first used, knew what the enemy had, and had knowledge of protection, and still suffered over 70,000 gas casualties out of a total of 258,000 casualties in the AEF. Only by properly training our units and being always ready can we insure ourselves against such a staggering proportion of gas casualties.

Unless gas is used, all the training time in gas defense and almost all the material for gas defense will not result in great tangible

returns, although they are the best possible insurance against the initiation of gas warfare by the Axis. Meanwhile, the Chemical Officer must train units in gas defense, teach them how to use smoke and incendiaries, and keep his fences in order against the day when the enemy may unleash his poison gas. Certainly there is no commander who will not exert every effort to insure his unit against the happenings of the last war when field hospitals were hopelessly overloaded time and time again with gas casualties, most of whom would never have become casualties if they had been properly trained in gas warfare.

We can only train, prepare, and wait—and then retaliate. We must not sacrifice our remaining advantage by not being fully prepared.

British Antitank Guns

From a British source.

THE British antitank guns are the two-pounder, six-pounder, and 17-pounder. The 25-pounder has been used against tanks most effectively, particularly in the open country of the desert where long range is important, but it was not designed for antitank purposes.

The smallest, the two-pounder, is used by the infantry, since its light weight, greater mobility, and high rate of fire (fifteen rounds a minute) make it the ideal weapon for ambushes or in broken or wooded country. Its shell will penetrate the armor of the heaviest German tanks at ranges of 100 to 300 yards. The gun itself swings round in a circle faster than a gun in a tank turret and has a beautifully easy sighting system. The little two-pounder was out-ranged in the Western Desert where the flat terrain—permitting observed fire at considerable distances—gave the heavier guns a tremendous advantage. But in broken country, the two-pounder is a highly efficient weapon.

The six-pounder gun is remarkably light, only a little over a ton. This lightness—so essential to mobility—is largely due to a considerable use of the welded technique in its construction. Its wide wheelbase (five feet) and its low center of gravity ensure stability in travel and make it an excellent weapon for use in rough country when on a tow, while it is easily concealed for action. It is effective up to 800 yards range and is also mounted in tanks. It costs £1,200 ($4,800) to make, and as long ago as September 1942 the British production rate was 300 per month.

The 17-pounder is designed to deal with the heaviest German tanks and can knock them out at ranges up to 1,000 yards. It can maintain a very rapid rate of fire and is the complete answer to the much-vaunted "Tiger" tank.

In addition to these guns, there is the PIAT gun, weighing only thirty-three pounds, but projecting a two and three-quarter pound bomb (not a shell) which can penetrate four inches of armor. This is an invaluable infantry weapon at close range.

The mechanized Army of today is entirely dependent on the mechanical condition of its equipment. The older the equipment, the greater the amount of preventive maintenance necessary. What are you doing to prevent breakdowns and deadlined equipment?

—Maintenance Division, ASF

Some Aspects of Personnel Management

LIEUTENANT COLONEL HARRY A. BALLF, *Field Artillery*
Chief, Policy Section, Classification and Assignment Branch, Military Personnel Division, Army Service Forces
Formerly Instructor, Command and General Staff School

THE War Department is now the largest single industry, if we may call it such, which employs civilian workers. It has on its payrolls about 1,200,000 civilian employees. The sources from which these workers are supplied decrease day by day because of manpower requirements for the armed forces, war industries, agriculture, and the essential service trades.

As the supply of available workers decreases we are forced to give increasing thought to the full use of our present strength. This has led to a more careful study of personnel management—the science of getting the most efficient use out of every worker in production.

This science receives a great deal of study by industry which before the war limited employments because it operated on a financial budget with the aim of making a profit. Now a shortage in workers has made it necessary to operate on a manpower budget, and again the need for a good system of personnel management comes to the fore.

The increase in foremen and supervisors needed to train new workers has not kept pace with the rapid growth in civilian employments in the War Department, which have mushroomed from 100,000 workers in 1940 to almost 1,200,000 at the present time.

Some of the outstanding factors which aid in personnel management are "job classification," "job induction," "employment training," and "improvement in working conditions." Let us consider each of these items briefly.

We are all more or less familiar with the system of "classification and assignment" which has been worked out for the Army. This classification compares favorably with the best in industry and has been modernized to meet the needs of the Army of today with its specialists in almost every field.

While we are quite familiar with the procedures which make up the system for the Army, most of us are not so familiar with the system for classification and assignment of our civilian employees in government service.

Various Congressional statutes, beginning with the Classification Act of 1923, have set up the basic legal framework within which jobs requiring the same skill and training, with the same degree of responsibility, are subject to the same salary scale. About half of the civilian working force of the War Department is composed of classified employees. The other half are ungraded employees who are paid under the wage administration system.

For those positions which are covered by the Classification Act of 1923, "job classification" is a legal requirement, but even for those jobs not covered by statute—the "ungraded positions"—"job classification" is a necessity because jobs must be evaluated for wage administration, placement, and promotion.

What is the difference between "classified civilian employees" and "ungraded workers"? Mainly this. All classified grades and jobs and the salaries to be paid for each of these throughout the United States are fixed by statute. Under the wage administration system, pay for "ungraded jobs" is adjusted to conform to wages and salaries paid for similar work in the same locality.

The Civilian Personnel Division of the Service Commands is charged, among other things, with supervision of the classification of positions for civilian employees. This is also true of other similar operating subdivisions of the Army Service Forces.

What does this require? It demands that these operating agencies have a classification specialist, or, as he is sometimes called, a "classification analyst," to evaluate and classify civilian employments. The classification expert is responsible for using this personnel procedure to the fullest extent in achieving the maximum efficiency from each worker.

The classification analyst accomplishes his

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task of establishing the grade of any job if it is "classified" and even if it is "ungraded" by making an analysis of the content of the job. All job analyses are based on five major job elements, which are listed as follows:

1. Subject matter, function, profession or occupation represented.
2. Difficulty and complexity of duties.
3. Supervisory and administrative responsibility.
4. Non-supervisory responsibility.
5. Minimum qualification requirements.

These five factors are evaluated in the individual job to discover likenesses and differences, and the relative degree of difficulty or importance of duties compared with other jobs.

The most important use of this personnel procedure is to simplify the problem of getting the right employee for the job. After the job is evaluated by a classification analyst, he will assign it to its proper class and give it the established title for the jobs in that bracket.

As this expert reviews the various jobs of an organization he is often able to point out weaknesses, duplications, and unnecessary operations, which may not as yet have been discovered or noticed.

Job classification simplifies the salary problem and helps to identify eligibles for promotion and future assignment. It is a record of positions in the organization. It is a morale builder because it

1. Assures equal pay for equal work,
2. Eliminates blind-alley jobs,
3. Sets up a ladder of promotion,
4. Encourages equitable efficiency ratings.

Above all, classification assures that the work is being done with the least time, money, and manpower. This is the objective of personnel management.

"Job induction" was mentioned as one of the important factors in personnel management. This may sound strange but it is nevertheless true. It often happens, especially where large numbers of people are employed in short periods of time, that this item is overlooked. The employee reports for work, is given a pencil or a typewriter and a piece of paper, and is told to go to work, without knowing what he is supposed to do, where he is, or what relation his job has with another job or with the total output of the organization.

Job induction is not a welfare responsibility. It is one that goes hand in hand with the promotion of efficiency and the full use of skills. If an employee is permitted to wander about on his job for two, three, or four months until he orients himself, much of the efficiency is lost that might otherwise have been obtained in that period.

The first impression which an employee gets of his new surroundings may well determine to a large extent his future output. Many forward-looking installations have introduced induction interviews and orientation programs to aid the new worker in getting over his initial embarrassment and to assure that he gets started on the right foot. A smoothly working, carefully managed personnel program should lead the worker promptly through the routine paper work incident to his appointment, put him to work as soon as possible, and begin immediately his employment training.

Too many employers in War Department activities are inclined to regard their civilian workers from an entirely impersonal viewpoint—as mere cogs in one of the very small wheels of a large machine. Many take the attitude that they are "outside the pale" so far as the military effort is concerned. Most of them are just as enthusiastic and willing as the military personnel if given "half-a-chance," if encouraged to develop initiative, and if afforded proper supervisory training on the job.

This leads us to a consideration of the training of employees, which was the third factor mentioned in good personnel management. Employment training has received more attention from industry and government during the present war effort than at any other time in our nation's history. It should include training "on the job" which is similar to "in plant training" in industry,

training through the use of employee handbooks for daily reference, employee counseling, and the encouragement of training courses in night schools designed as refresher courses and for further improvement.

These night school courses at business colleges and similar technical institutions should not be overlooked. Such schools are equipped through long years of experience to train employees in the use of modern office appliances and in methods which increase skill in the operation of them.

Employment training is necessary to keep abreast of the increased demands that will be made, because the civilian force of the future is not going to be the cream of the crop in either manpower or womanpower and present employees should be trained to instruct and help them. Why is this so? For the most part the best of the civilian workers will be drawn into the war and the war industries. Eventually this force may consist only of partly trained youth fresh from the schools, housewives who have had some previous office experience which they abandoned long ago in favor of matrimony, and overaged and physically handicapped persons who are not fully qualified for general military service.

The development of supervisory training programs "on the job" is one of the best answers for maximum production through increased efficiency. The training of stenographers, typists, and clerks in military correspondence is an excellent example. Indorsements of all kinds to letters are entirely foreign to most new employees of the War Department. An explanation of the use or ordinary indorsements, check indorsements, wrapper indorsements, and the like is required.

If the new employee senses early in the game that there will be a chance for promotion and advancement as a result of increased efficiency and productivity it will not be hard to sell him on the idea of getting all the training possible.

The mention of promotion and advancement suggests at this point a consideration of the fourth factor which we mentioned under our guide to good personnel management —"improvement in working conditions." The civilian employee also has a "morale," and it often needs "boosting." Improvement in working conditions is best developed through sound personnel relations. This requires fostering policies which will promote maximum satisfaction with the job. The personnel policy of any organization is the key to its success or failure as an operating mechanism.

How may a job be made more attractive? Proper pay for services rendered is a most important consideration. Wages and salaries must be fairly and honestly decided, and they must compare favorably with payments for like services in industry.

A uniform policy on leave, hours of work, overtime, and promotion will contribute much to efficiency. There is nothing so demoralizing to employees as to have a liberal leave policy in one office and no leave at all in another, high pay in one section and no chance for advancement in the next, or continuous requirements for overtime in one group and little or none in the other.

An item which will do much to increase the attitude of satisfaction with the job assignment and brighten the conditions under which the employee is working is the encouragement of individual initiative. There are many small procedures which an employee can carry through without a great deal of supervision. He should be encouraged to do this, and he appreciates it. Often the results obtained are far better than when he is harassed by close supervision.

The War Department also recognizes that the attitude of the worker toward his job can be improved by providing him a chance to express his ideas for improvement in procedures. A "suggestion system" has been developed which permits employees to submit their ideas for improvements. It provides a financial reward for suggestions which prove valuable. It is amazing, sometimes, the number of useless and worthless time-consuming processes that are abandoned as a result of some of the suggestions proposed by workers. The saving in money and manpower has also been significant.

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Large industries, or what we know as "big business," employing from 50,000 to 100,000 persons, devote a great deal of time to the management problem. The man who handles personnel in these organizations is a vice-president of the company. No one else makes a move on personnel matters unless he tells them what to do and how they are to do it.

The management job in the Service Commands and other operating subdivisions of the Army Service Forces, which employ all the way from 10,000 to 50,000 civilian employees, is also "big business." As such it needs an efficient system of personnel management.

It should be reiterated in conclusion that personnel management is the science of getting the most efficient use out of every worker in the production program. It involves careful assignment, continuous training, and prudent administration.

Problems of Message Writing

From an observer's report on the Italian campaign.

IT is essential that officers learn how to write messages. The majority of messages received in the G-3 section during the current operation were entirely lacking in one or two important items. The time signal was the greatest omission, especially when the text of the message failed to note the time of an observation. The G-2 and G-3 sections of this division were constantly on the phone or writing additional messages requesting classification of these messages, thereby causing additional delay in getting action started, overloading the already crowded telephone circuits, and causing increased traffic over the air.

The what, when, where, who, etc., as set forth in the field manuals, were disregarded in many cases. The reason for lack of completeness was usually the desire to be brief on the part of the writer.

The Pre-Invasion Aerial Assault

From an article in *U. S. Air Services* July 1944.

THE scope of the pre-invasion aerial bombardment of Nazi-held Europe during the month of May, 1944, is revealed by the War Department with the announcement that the United States Eighth and Ninth Air Forces operating out of the United Kingdom broke all records for bomber and fighter operations.

The Eighth Air Force, going into action twenty-seven days in a month of mounting pre-invasion assaults, completed more than 30,600 sorties—more than 16,400 for the bombers and 14,200 for the fighters. The Ninth made more than 30,000 sorties into enemy territory to attack 100 different targets on the continent.

More than 36,000 tons (in excess of 32,000 long tons) of bombs were dropped by the Eighth. Of this total, more than 20,400 tons were directed at targets in Germany itself. The Ninth, operating against purely tactical or semi-strategic objectives, primarily rail, road, and canal traffic in Northern France and Belgium, dropped more than 20,000 tons, an increase of sixty percent over the April figures.

The Luftwaffe met these assaults with a furious defense at some points and little or none at others. The gunners of B-17 Flying Fortresses and B-24 Liberators shot down 428 Nazi planes, while Eighth Air Force fighter pilots destroyed 475 in the air, and many others on the ground. Their losses for the month were 310 bombers, less than two percent of the number dispatched, and 171 fighters, less than one percent of those sent out.

MILITARY NOTES AROUND THE WORLD

GERMANY

Me 323:

The largest plane yet used by the German Armed Forces is the Messerschmitt "Me 323." Its technical details, most of them taken from the review *Wissen für Alle*, are as follows: wing span, 55 meters; wing area, 300 square meters; length, 28.5 meters, load capacity, 12 tons; length of cargo space with solid floor, 11 meters; width of cargo space, 3.15 meters; height of cargo space, 3.30 meters; cubic capacity of cargo space, 100 cubic meters. The loaded plane requires a stretch of some 800 meters for the take-off. The landing gear is to a large extent capable of traveling on any terrain and permits of landing on unprepared fields. It consists of ten wheels, the six rear wheels being provided with airbrakes. Gun emplacements are located on the side walls of the fuselage, on the floor, and in the roof of the cabin. The Me 323 is equipped with six Gnome-Rhone 14N motors of 965 horsepower each (at 4,000 meters height). In order to render take-off easier, four rocket drive units may be built into the wings. The crew consists of two pilots, two mechanics, and one radio operator.

(*Neue Zürcher Zeitung*)

A German Bazooka:

Among newer weapons developed by the Germans is one similar to the American bazooka, called the *Faustpatrone* and "Revenge Weapon." However, a German prisoner has reported that no German soldiers would use it willingly after one had exploded on being fired, shattering the user's head.

(*Army Ordnance*)

Sea Obstacles:

When the Allies invaded Normandy, they encountered, in addition to other obstacles,

the type of obstacle shown in the picture above. The blocks of reinforced concrete are provided with pointed, protruding arms. Thousands of these giant barbs were placed just off shore all along the invasion coast.

(*Berliner Illustrierte Zeitung*)

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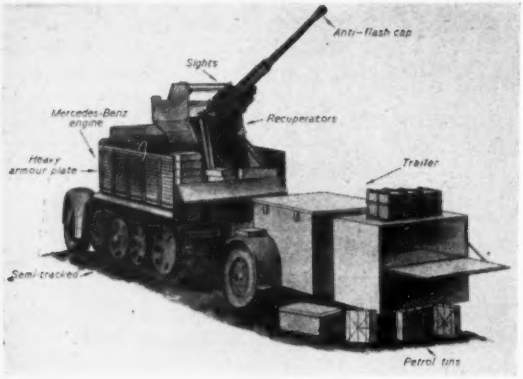
Mobile Aircraft Gun and Limber:



In order to bring an antiaircraft barrage to bear where it is most needed, the Germans in Italy are making use of the weapon shown. The trailer-limber is built in two parts, on a base which runs on rubber wheels. Both petrol and ammunition are carried in this trailer. The gun itself is mounted on a tracked vehicle powered by a big Mercedes-Benz engine and protected along its sides with heavy armor plate.

(*The Sphere*, Great Britain)

Floating Antiaircraft Batteries:

Floating antiaircraft batteries of the German Navy are used against Allied bombers approaching from the sea. Their range-finding instruments, located on the highest point of the ship, keep the enemy in view and constantly transmit firing data to the guns.

(*Berliner Illustrierte Zeitung*)

The German Fleet:

Besides the 45,000-ton *Tirpitz*, the principal warship of the German Navy, which has been disabled in Alten fiord, Norway, the important surface ships remaining to the Germans include the following: The 26,000-ton battleship *Gneisenau* is lying dismantled at Gdynia. In the Baltic also are the "pocket battleships" *Admiral Scheer* and *Lützow*, the aircraft carrier *Graf Zeppelin*, and probably the cruisers *Admiral Hipper*, *Prinz Eugen*, *Nürnberg*, *Leipzig*, *Köln*, and *Emden*. There are also two old coast defense ships, the *Schleswig-Holstein* and *Schlesien*. Of these, the *Graf Zeppelin* has never been seen at sea, and appears to be regarded as a white elephant. Indeed, it has been reported that her armament has been removed. Two other ships, the aircraft carrier *Peter Strasser* and the cruiser *Seydlitz*, remain in an incomplete state.

(*The Navy*, Great Britain)

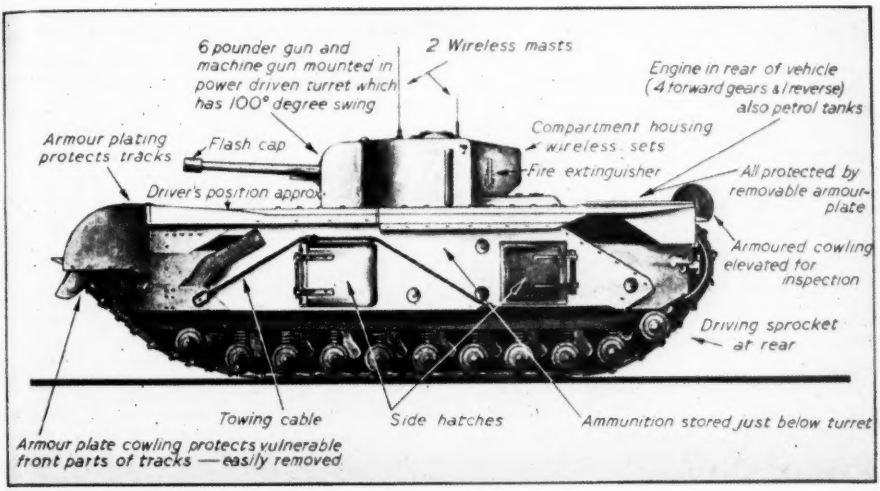
Portable Pillboxes:

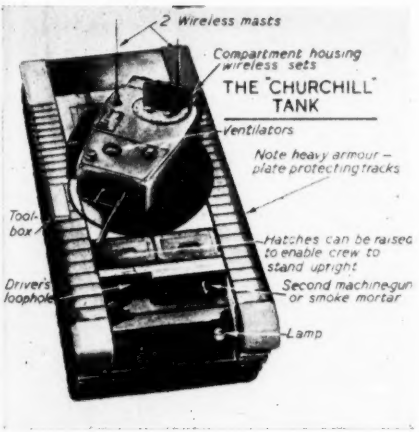
Portable enemy pillboxes added to the difficulties of the Fifth Army ground forces in attacking the German line in Italy. The prefabricated, kettle-type pillbox is turned upside down, set on two wheels, and drawn by a tractor. It has been called one of the most astonishing defenses the Germans have developed. It is about five feet wide, and almost six feet high, but only the six-inch concrete dome and machine-gun snout are visible—and then only within ten yards, because the installation is generally well camouflaged, and the gun fires a smokeless powder. A bellows cools the gun after it is fired. A steel lid can be drawn over the port, and when this is done observation is through a pair of periscopes jutting from the top. The pillbox is manned by a crew of two.

(*Army Ordnance*)

GREAT BRITAIN

The "Churchill" Tank:


6 pounder gun and machine gun mounted in power driven turret which has 100° degree swing
2 Wireless masts
Engine in rear of vehicle (4 forward gears & 1 reverse) also petrol tanks
Compartment housing wireless sets
Armour plating protects tracks
Flash cap
Fire extinguisher
All protected by removable armour-plate
Driver's position approx.
Armoured cowling elevated for inspection
Driving sprocket at rear
Towing cable
Side hatches
Ammunition stored just below turret
Armour plate cowling protects vulnerable front parts of tracks — easily removed



The British "Churchill" tank weighs approximately thirty-five tons, is powered by a Bedford engine developing 350 bhp [brake horsepower], and has a speed of about twelve to fifteen miles per hour. The tank gives the impression of colossal power and solidarity, but at the same time, having regard to its weight, it is very maneuverable. It is known as an infantry tank and is used in close co-operation with the infantry.

The "Churchill" is the result of much experimenting, discarding, and improving. The early models mounted a two-pounder gun, but this was later replaced by a six-pounder which has a greater armor-penetration performance. The gun is so steady in its power-driven, revolving turret that surprisingly little skill is required to fire it accurately. The tank can be immersed in water up to a certain point without suffering any ill effects.

These tanks were used in the Dieppe landing and a small number were used in the Middle East. They were also used in North Africa, were favorably reported upon, and the Germans had a very healthy respect for them.

(*The Sphere*, Great Britain)

The Jeep Takes to the Rails:

The war's most famous vehicle, the jeep, already equally at home on land, water, and snow, has now taken to the railway. This

latest form of the ubiquitous "war buggy" is the work of an officer in the Royal Engineers. Back on the road again, the jeep carries its railway wheels on specially designed brackets which hold either type of wheel.

(*The Illustrated London News*)

"Bullet-Proof" Tire:

A British "bullet-proof" tire is in wide use in France. The tire is being manufactured in Britain and in America to a British design made available to the United States under reverse lend-lease. It is not actually bullet-proof, but by reinforcing the walls, providing an inner ring, and strengthening the beading, a flat tire can be run for forty miles before it is completely ruined. The tire when flat can carry the weight of a vehicle without slipping.

(From a British source)

Flail Tanks:

The flail tank is one more example of a weapon being kept secret long after it has been in use on a sizeable scale. The flail tank was first used extensively as long ago as El Alamein. It is, in principle, extremely simple; a boom is built onto a tank, at the end of which is a revolving drum. Lengths of heavy chain are fastened to the drum—one end attached, the other hanging free. When the drum revolves, the chains flail the ground in front of the tank, thus exploding antitank and antipersonnel land mines.

In Normandy the device was used on the Sherman tank. At El Alamein they were mostly on Mathildas and Valentines, which, when fitted with the flails, were called "Scorpions." The latest improved models are "Crabs." The flail drum on the "Crab" is driven by the tank's own engine, an improvement over the "Scorpion" which required a separate motor for the drum.

(From a British source)

INDIA

Indian Officers:

According to General Sir Claude Auchenleck, Commander in Chief, India, the ratio of Indian to British officers has steadily increased during the war. Whereas in 1939 the proportion of British officers to Indian was 9.5 to one, on 31 March 1944 it was 1.3 British to one Indian, excluding from consideration British Service officers temporarily attached to the Indian Army as a war measure. He said that he was prepared to take as many Indians as he could get, provided that they were of the right stamp and fit to be leaders of men.

(*Journal of the Royal United Service Institution*)

U. S. S. R.

American Fliers from Soviet Bases:

Since the flight of the American heavy bombers from Soviet bases is now secured through the frontal zone by Soviet air patrols, the American command has now resorted to a "catch up" method of escorting. The Flying Fortresses climb to a great height and cross the front line unescorted. They then fly through the so-called "tactical surprise zone," a zone which the bomber can negotiate before the enemy fighters have time to take off, gather height, and make ready for the attack. At some prearranged point in

this zone the Mustangs must catch up with the bombers. This method first of all enables the fighters to save much-needed fuel because they take off later than the Fying Fortresses. Second, it confuses the enemy because his observation posts first see only Flying Fortresses and report to the antiaircraft system accordingly. The appearance of the Mustangs is a surprise to the enemy fighters, who had expected to attack unescorted Flying Fortresses.

(*Information Bulletin*, Washington Embassy of the USSR)

BELGIUM

Belgians' Part in Air and Sea Warfare:

Belgium has now more airmen than she had in May 1940 when the Germans invaded her territory; and though a land power from the point of view of national defense, with fortifications but no navy, Belgium has been able to place at the service of the Allies enough trained seaman to form a Belgian section in the Royal Navy.

In May 1940, there were just over 400 pilots for Belgium's 300 aircraft. Now the Belgian air force includes, in spite of losses during the Battle of Britain, 1,091 men, 614 of whom are flying personnel. There are two complete Belgian Spitfire squadrons, and one Belgian flight in a famous British squadron. Belgians are flying in all operational commands in Great Britain and abroad, including the Middle East and India. Up to the eve of D-day, Belgian airmen had shot down 104 enemy machines and probably forty-five more, and had damaged fifty-three.

Although Belgium's part in the war at sea has been mainly in the merchant service—almost the whole of the Belgian merchant navy, about 400,000 tons, was placed at the Admiralty's disposal—many Belgians who had never dreamed of wearing a sailor's uniform are now serving, as members of the Belgian section of the Royal Navy, in patrol ships, mine sweepers, barrage balloon carriers, and corvettes.

(*The Times*, London)

SWITZERLAND

New Swiss Submachine Gun:

The Swiss infantry has recently been provided with a new submachine gun, M43, of Finnish design. The weapon weighs 4.7 kilo-

grams, its caliber is nine millimeters, and its magazine holds fifty cartridges. It can be quickly broken into two pieces—stock and breech, and barrel and sleeve—and reassembled in less than ten seconds. The weapon is inexpensive and easy to manufacture. Excellent results have been obtained at ranges up to 300 meters.

(*Revue Militaire Suisse*)

CANADA

The Canadian Army:

The Army that represents Canada on the battlefronts today is the result of the wartime expansion of a small pre-war permanent force of 4,500 men. The strength of the Canadian Army as reported for June 1944 was more than 465,000 men, and in addition there were more than 13,000 women in the Canadian Women's Army Corps. More than 245,000, including more than 800 members of the CWAC, were in the Army overseas. The Royal Canadian Air Force overseas now has a total strength of more than 50,000 officers and men. Its strength almost doubled between 1 January and 31 December 1943.

(*Canada at War*)

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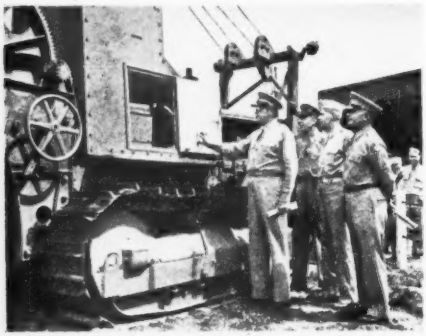
UNITED STATES

Beach Tractor:

The toughest terrain in an invasion is the short strip of water and sand reaching from the bar where the landing craft touch bottom to the point where firm ground rather than beach sand begins. Moving the Army's equipment and supplies across this strip of sand



and water is the business of bulldozers which are normally and almost invariably the first pieces of heavy equipment to be unloaded from the landing craft.

Designed especially for the Engineer Special Brigades who are the Army's specialists in beach supply, the bulldozer of all bulldozers is the new "beach tractor," which, in addition to the bulldozer blade, is equipped with a self-mounted crane and a double-action power control unit. The crane gives the beach tractor the additional function of lifting loads directly from the landing craft and swinging them onto trucks or trailers. The double-action control unit gives the beach tractor an ability to hook tows onto either its front or its back quickly without the necessity of turning around on the crowded beach. The beach tractor also carries as standard equipment an armored cab for the protection of the driver. The bulldozer is such an important piece of equipment on the beach that the driver cannot take time to seek cover from enemy small-arms fire or bursting shrapnel.

(*The Military Engineer*)

Improvements in the Carbine:

Now equipped with the grenade launcher, the lightweight carbine in the hands of a well trained foot soldier can stop a 30-ton tank. Attachment of the grenade launcher is one of several new improvements which make the carbine more effective than ever.

Use of the grenade launcher gives the caliber .30, 5½-pound, three-foot-long carbine the same antimechanized firepower as the heavier 1903 and M1 (Garand) rifles which also use it. It can be employed against tanks and men and for pyrotechnic signals. Other improvements to the carbine add to its accuracy of fire and also lessen the effects of recoil and reduce the trigger pull.

Infantry divisions now are equipped with nearly as many carbines as heavier rifles. The carbine's rapid-fire action, light weight, and lesser recoil make it a valuable close-in weapon where there is need for greater power and accuracy than the pistol provides. A soldier can carry approximately twice as many cartridges for the carbine as for the other rifles, since they weigh only about half as much.

(*Army Ordnance*)

UNITED NATIONS

Numbering Army Groups:

The Allied armies invading Normandy were organized as the 21st Army Group. The Army Group takes its number from the two armies which form it—the Second British and the First American. In earlier campaigns, too, the Army Group number was a combination of the numbers of the armies which composed it. In Tunisia, two British armies, the First and the Eighth, fought as the 18th Army Group. This group in addition contained the Second U. S. Army Corps and the 19th French Army Corps. In Sicily, the numbers of the Allied armies engaged—the Seventh U. S. and the Eighth British—were added together instead of being, as it were, set side by side, and they operated as the 15th Army Group.

(British Information Services)

FOREIGN MILITARY DIGESTS

Conduct of War

Translated at the Command and General Staff School from a German article by Wilhelm Weiss in *Völkischer Beobachter* 18 June 1944.

IN Normandy, as stated in the official communiqué of 15 June, the fighting is approaching its climax. We are sure of one thing, that in a war conducted with massed armies and highly scientific means a period of fourteen days (the fighting in the west will soon have been going on for that length of time) no longer suffices for the achievement of a combat decision of any final significance. The battle fronts have become too extended for a definitely final catastrophe to be possible any longer as the result of a single, devastating blow. The modern theater of war, stretching over continents and seas, must be conquered in its totality if capitulation to the superior will of a more powerful adversary is finally to occur.

The invasion battles on the coast of Normandy illustrate this. The Anglo-American forces between the Orne and the east coast of the Cotentin Peninsula have occupied a strip of coast about a hundred kilometers in length with a depth, so far, not exceeding thirty kilometers. For days, now, in spite of the most violent efforts and the most reckless employment of men and matériel, the invasion troops have not been able to go beyond this initial success. German inferiority at sea, in comparison with the overwhelming invasion fleet of the greatest naval powers on earth, represents a tactical disadvantage for which even the most powerful of coast defenses cannot compensate. The fighting up to the present time has made it apparent that equilibrium will be restored again as soon as the enemy is forced to operate with his land forces alone, and fight his way forward without the superior fire support of his massed naval artillery. Even Montgomery's armored divisions have not succeeded in breaking through the German barrier positions which have been established clear around the enemy bridgehead. Neither could they secure for the expeditionary army, which is crowded together in a narrow area on the coast, the freedom of movement so urgently needed. For this is the initial prerequisite in the establishment of a basis for those operations which can impart a strategic value to the landing itself. Montgomery faces, therefore, the task of getting his invasion army out of the confined quarters of the bridgehead before he can attain even the first of the initial objectives of his operation.

But there is no doubt now that the present military situation will remain unsatisfactory to the invaders as long as the position is flanked by the two port cities of Cherbourg and Le Havre. As long as these important ports with their facilities for unloading necessary heavy war materials are not in the enemy's possession, the organization of his supply system—which at the present time is obliged to rely on inadequate landing beaches between Caen and Sainte Mere Eglise—will become increasingly difficult. The more divisions are unloaded into this area, the more the military situation approaches a condition in which the sea, to the rear of the enemy's

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front, ceases to be purely an advantageous medium for assuring a flow of supplies.

So far, the course of the invasion has not kept pace with Eisenhower's schedule. The German defense has perhaps already accomplished more than can be seen at the present time. The fighting in the west is, quite obviously, proceeding in accordance with laws which depart neither from the fundamental principles governing the conduct of war nor from the idea that the war which is being waged today on all the fronts of Europe must be regarded strategically as a unified whole. The Anglo-Americans have now opened the second front that has been demanded for years by Moscow. But the military significance of this, even for the invader, cannot consist in undertaking an invasion merely for the sake of the invasion. The landing operation up to the present time, therefore, can be regarded only as a constituent part of a larger plan in accordance with which the enemy commander in chief in the west obviously expects to carry on his operations. The twenty to twenty-five divisions that Montgomery has so far landed in Normandy are only a part of the combat forces that Eisenhower has ready in England for his campaign in western Europe. Eisenhower himself, in a statement made a few days ago, designated the present landing as only a part of the far greater project of combined attack by the Soviets from the east and by Allied forces from the Mediterranean against "Fortress Germany." This declaration may also serve as an explanation to us of the carefully weighed reaction that the landing has so far produced on our part from the military point of view. For the great battle that will be waged in western Europe during the coming weeks and the areas on both sides of the Channel form but a single connected theater of operations. The battlefields of the past, which could be surveyed from the vantage point of the commander's hill and ended in either victory or defeat in a single day, have become more expanded. They can no longer be mastered, so far as time is concerned, between sunrise and sunset. But the basic principles of modern strategy are essentially the same as in the time of Prince Eugene or Moltke. It is still necessary to achieve mastery in the conduct of military operations as one would achieve the mastery of a science, and he is master who is able to bring the enemy under his will from the standpoint of his spirit. There exists, therefore, no doubt but that at the present moment we find ourselves, in the western theater of operations, in the midst of a situation in which the initial assembly of Eisenhower's combat forces has by no means come to a conclusion. And it is just as clear that the decisions of the German command are determined by considerations which, over and beyond the events transpiring on the Orne and on the Vire, never for a moment lose sight of the operational situation as a whole. The last reports from the commander in chief of the armed forces reveal clearly that the decisions of the German command constantly and systematically take into consideration the war situation as a whole.

It is absolutely not true that on this occasion the attempt to spare Germany a two or three-front war has failed in the fifth year of the war after the obvious success of the first half of the war. For it makes a difference whether the defense fronts of the Reich, as in the first World War, face the concentrated offensive might of enemy encirclement from the beginning, or whether the military genius of Adolf Hitler permits the enemy in the east and the west to advance to the attack one side at a time, turn by turn, so to speak. To be sure, the German attack which began three years ago in the east and which carried the victorious German armies clear to the outskirts of Moscow and to the Volga is again today virtually back at the starting point. But it was only this plunge into the vastness of the Russian territory that made possible for us the retreat from Stalingrad to Czernowitz without heavy losses. On the other hand, the threat of an attack that menaces us today from the massed armies of the Soviet Russians east of the Carpathians can never again be so dangerous as it would be if there stood ready for attack in the east a Bolshevik army that

had not been weakened and decimated by three campaigns. We are the last to be inclined to underestimate the enormous danger with which the nuclear nations of Europe are threatened. But we know that the three years of defense against the enemy in the east constituted a predecision in the operations in the west at the present time. The potentates in the Kremlin followed only their primitive instinct when, in 1942, they demanded the immediate opening of a second front on the part of their western Allies. The destruction of the enemy in a decisive, concentric operation might be accomplished by a Moltke in the relatively small theaters of operation of the 19th Century. The absolutely gigantic magnitudes involved in modern war would, however, present an unsolvable problem to Eisenhower and his military colleagues in the east and south of Europe. In these five years, military feats have been performed with which even the offensive of the invasion powers must reckon. When, in the year 1941, the German armed forces started their attack on Soviet Russia, which had not yet completed her initial mobilization, they were able to do this at a time when they were free from a threat in the rear owing to the defeat of the democratic powers in the west. The war situation today is no longer the same, however. But even though the enemy in the east is changing over to the offensive, yet it is today an enemy with whose strength—and weakness—we have come to be acquainted accurately in the three years of war. Above all, the situation has also changed fundamentally for our western enemies. Their hope that the Reich would bleed to death in its struggle with the Bolshevik war machine has not been fulfilled. They must now fear much more that the same thing will happen to them. The stubborn resistance that the brave German soldiers are offering to the invaders has already cost the Anglo-American attackers so much bloodshed that even in the most favorable case they could hope only for a victory of the Pyrrhic type which would leave them unconditionally at the mercy of the dominant power of the Soviet Russians in Europe.

However one cares to regard the war situation, the outlook for the invaders in the west has not become any better than it was before the landing. War is not amenable to purely mathematical calculations, and total war, in which the last and utmost efforts of nations are mobilized, is still less so. This fifth year of the war, in which events are moving to their climax, will, unless we are greatly mistaken, witness the triumph of military skill which in the end will prove a more decisive factor than the whole levy of masses and matériel with which our enemies hope to conquer. In the military skill of Adolf Hitler we have an unbounded faith, since it is able to take into account not only military factors but also all those imponderables whose accurate inclusion in the laws governing military operations form the basis of victory. Or, as a neutral military writer recently expressed it: "Every struggle, in the final analysis, is a psychological one; it is directed against the soul of the enemy leaders and forces."

Against the soul of the enemy, in a very major way, is directed the attack of the new German weapons [the flying bomb], which yesterday was begun against the British capital city. In this attack, the German command strikes the enemy a blow at a moment in which he must use all his strength for the purpose of deploying his military might in the offensive across the Channel. The decision of the German command was, therefore, obviously determined to just as great an extent by military as by psychological considerations. As always, the German strategist has awaited, with sovereign calmness, the moment which appeared the most suitable for opening up with the long-prepared and powerfully intensified effects of scientific weapons of warfare. In so doing, we are again certain of one thing: the employment of new-type weapons is not, in itself, decisive in warfare. It always depends on how and by whom they are used. The spirit and the soldierly principles that must govern a revolutionary weapon technique are factors of vital importance if it is to prove successful.

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The sound of the heavy explosions with which the island is filled at the present time is only the echo of that revolutionary, National-Socialistic spirit that will never be ready to lay down its arms to an old world order that disregards the German people.

The world stands today in the shadow of the event at whose military repercussions we can only guess. We have no intention of airing any premature speculations regarding it or of entertaining any baseless illusions. But there is one thing that we must note with satisfaction, and that is that once again the initiative is on our side in the field of weapon technique. On the British Isles, however, they are compelled to conform to the situation that the superiority of the German command has again imposed upon them.

Method of Defense

Translated and digested at the Command and General Staff School from a German article by Baron von Esebeck in *Deutsche Allgemeine Zeitung* 19 June 1944.

DISCUSSION regarding the sense and purpose of the Maginot Line came to an end with the conclusion of the campaign in the west in a manner that proved a surprise—and not to the enemy alone. Its character had been one of fixed defense and was, consequently, the alpha and omega of the French government.

In consequence of having failed to build into the Maginot Line any opportunity for offensive action, a war would inevitably be lost by France the moment this line was pierced or bypassed by an encircling movement. The fall of Eben Emael immediately showed with clarity that, with the technical matériel of modern war, even the most powerful of armored bastions can be crushed, and that therefore every fortification fulfils a tactical mission in the joint offensive planning of a decision, but nothing more.

For in this as in every war, it is the "psychic Maginot Line"—the fighting ability and fighting will of the soldiers—that is the decisive factor. It was lacking in the French Army when it was drawn into the struggle in 1939 with neither will nor motive for fighting. Apparently out of reach of enemy weapons, an army was to live and carry on under the surface of the earth, which was supposed to give it security and that intrinsic ability to defend itself without which no soldier fights. But with Eben Emael and the Shönenburg fortifications (on the Saar) it was not only giants of steel and concrete that went down. The faith in the fortifications that were to save France was also lost. The German war machine did not go to pieces on the Maginot barricaded zone as the world had expected it would. There was no repetition of the example of the first World War in which Germany was bled white in a war of position and Verdun became a tragic Menetekel. Four weeks after the beginning of the campaign, victorious German soldiers were marching past the Maginot monument in Verdun. Two weeks later the campaign was ended and France was eliminated.

Was the Atlantic Wall a German Maginot Line? Was its purpose the same as that of the French system of fortifications on the western coast of Europe? It has, to be sure, one thing in common with the Maginot Line: both have a defensive character. But this is not tantamount to saying that in consequence of this the German command has neglected to take measures for offensive action as the French did.

There was no doubt that the enemy would first undertake an invasion in that place where a shorter route offered him the greatest security for his supply lines. Hence the mission of the Atlantic Wall could only be to make landings impossible for the enemy in certain sectors or to render them difficult, thereby imposing bloody losses on him in the first phase of an invasion and giving us more time in which to bring up our forces. Under no circumstances was the Atlantic Wall sup-

posed to be able to make an invasion impossible.

When on 6 June the enemy hurled his first waves against the continent, he immediately encountered violent resistance. The enemy had been expected. He had not surprised us. His airborne units landed or leaped into an empty area, as carefully picked by the enemy as it was carefully comprised by us in our calculations. It lies in the nature of things that the interior of a country cannot be wholly ready for defense. Hence, such a landing cannot be prevented, yet it can nevertheless be quickly neutralized during the further development of operations by rapidly bringing up reserve divisions. The mass of the airborne divisions were wiped out or decisively attacked. They had, however, in a certain sense fulfilled their mission to the extent that their fighting in the rear areas of the coast delayed the rapid transportation of our reserve forces to the theater of operations, while only the defense forces of the coastal sector were available for defense.

It was about the first hour of 6 June when the enemy air force dropped its first air bombs —whitish-green clusters which appeared to mark off a broad area, an area which was lighted up, in addition, by the reddish-violet glare of parachute flares. Landings by paratroops and troop-carrying gliders in the rear and coastal areas began at the same time and were continued for the following two hours. This was accompanied by bombing attacks of an unprecedented intensity. By dawn, the enemy naval forces also opened fire on the area where the penetration had been effected, and at the same time began unloading forces along a stretch of twenty to twenty-five kilometers of the coast. Under the protection of a smoke screen, the first waves of landing troops shot forward. They were to clear away the obstacles in the forefield.

Under the protection of the long-range naval guns and the Anglo-American air force, the unloading of forces was accomplished between the Seine and the Vire immediately after the landing of the airborne divisions. The enemy had an air force at his disposal which assured him of the greatest freedom in his landing operations. The bombardment of our fortifications continued without cessation. Wherever resistance was displayed, the enemy dropped his bombs over large areas and with a prodigality of matériel unparalleled in the history of modern warfare.

The Atlantic Wall was built not so much to stop the invasion as to slow it, and now it was really revealed that the Atlantic Wall in the area of the penetration is in truth backed by the moral resistance of the German soldier. Cut off and left solely to their own resources, our strongpoints continued to fight valiantly, stubbornly, filled with superhuman will and consciousness of duty.

The first operational objective of the Anglo-Americans was the conquest of the Cotentin Peninsula. How much it was in the plans of the enemy to carry out other landing operations immediately is not known for the time being. While the first phase of the struggle was in progress, the curtain was raised on the second phase—a sort of race to bring up attack formations to which the command on the far side of the Channel had assigned the task of plunging forward from the bridgehead, of cutting off the Cotentin Peninsula, of splitting up the German defense formations, of annihilating them, and of securing Cherbourg as a basis for their operations.

This plan has not yet succeeded on the tenth day since the landing. Any one who faces our western opponents in the capacity of a soldier is inclined to believe that this development has its roots in their fighting traditions. We became acquainted with them in Africa; we became acquainted with them in Italy. The Anglo-American command has never regarded daring as the last word of wisdom, but rather safety through superiority of matériel. "Safety First" has been their watchword in the conduct of operations in which they have always seemed to shy at the idea of risk. The battles of Sollum, Sicily, and Anzio are the classical examples of this at the present time. Not until overwhelming superiority in the way of matériel has been achieved do they move out to the attack. They then attack with a recklessness and vigor that are remarkable. The decisions of

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their commands are not devoid of a certain flexibility, no matter how precisely the operations, as a whole, even down to the last detail, have been planned.

And yet on the eleventh day of the invasion the enemy is only beginning to widen his bridgehead and make a start in his conquest of the peninsula. As a matter of fact, it was the German defense that set his plans awry in the "hellish fire of the Atlantic Wall system"—to quote an English phrase—and prevented him from attaining this objective in the first rush of the attack. It was not only that his plans were set awry by the strength of our strongpoints and the will to resist of our iron divisions, but, what amounted to much more than this, such important losses were inflicted on him that he was forced continually to bring up new formations. In spite of his powerful fire protection, his airborne divisions were subjected to a decimation that far exceeded that counted on by the enemy.

Since the formations already engaged in combat must be estimated at more than twenty-two divisions, it is possible that as a result of his losses the execution of other plans of the enemy has been delayed, if not totally prevented.

Thus, indeed, up to the evening of the tenth day of the invasion, the enemy has been able to establish a continuous front in the sense that he has succeeded in joining the eastern and western landing groups and has deepened the area southwest of Bayeux by several kilometers. But on the whole, the lines have not been altered. The invasion did not continue according to plan. The enemy has not attained his initial objective. Even the steady flow of supplies to the beachhead has not been able to alter this fact in the first ten days. No one, friend or enemy, knows what the next days will bring forth. One thing, however, is sure: the enemy is forced to attack. But the violence of the fighting shows how conscious both sides are that they are in a struggle for victory or defeat.

The Kursk Operation

Translated at the Command and General Staff School from a Russian article by Colonel P. Boldyrev and Lieutenant Colonel N. Artemyev in *Krasnaya Zvezda* (Red Star) 8 February 1944.

IN the last days of January 1943, the troops of the Voronezh Front under the command of General Golikov and of the left wing of the Briansk Front, having routed the Voronezh-Kastornoye enemy group, were attacking in westward and southwestward directions. The remnants of the defeated German-Hungarian units were retreating under the cover of rear guards, trying to disengage from the pursuing forces.

It was imperative to pursue the retreating Germans as persistently as possible in order to prevent them from reorganizing on previously prepared positions. Of utmost importance for the accomplishment of this task was the occupation of the city of Kursk, which connected the Orel and Kharkov groups of the enemy and enabled him to maneuver his forces along the front and in the rear areas (see Figure 1). The fortifications in the Kursk sector protected the junction of the central and southern German army groups. The German command, realizing the exceptional importance of Kursk, took all necessary measures for defending the city.

The mission of capturing Kursk was given to the right wing of the Voronezh Front under the command of General Cherniakhovski. Its success depended primarily on the speed with which this operation could be carried out. General Cherniakhovski's troops, therefore, advanced very rapidly without any overnight stops. Only periodic halts were allowed. The advance proceeded under exceptionally difficult conditions. Frequent snowfalls, storms, and snowdrifts obstructed the roads and made them hardly passable for infantry, and impassable for motor

transport. To insure the speed of the advance, local populations and sapper groups were employed for clearing and repairing roads. The repair of vehicles was organized along the routes of the moving columns. All local means of transportation were mobilized for the transfer of troops. Strong mobile

FIGURE 1.

advance guards were moving ahead of the main body, wiping out enemy rear guards and securing the advance of the main forces. Thanks to their tremendous effort, the troops of General Cherniakhovski reached the Tim River on 2 February, having covered, under the most difficult conditions, more than eighty kilometers in about two days. The attack in the general direction of Kursk was launched on 3 February.

During the battles of 3 and 4 February, our units broke through the German defensive positions near Shchigry and Tim, where the enemy had expected to stop our advance, and continued to pursue him, repelling many counterattacks of the German infantry and tanks and overcoming furious resistance on the part of separate garrisons and rear guards.

During the battle for the Shchigry-Solntzev position, which was a serious obstacle on the approaches to Kursk, our units encountered strong resistance organized on previously prepared positions. The unit of General Shkrylev, which operated on the right flank of our troops, was ordered to take Shchigry. The position protecting Shchigry was defended by two enemy divisions. Here our units, advancing on a wide front, were stopped. Without losing time, General Shkrylev transferred, under the cover of darkness, the main forces of his infantry, artillery, and mortars to his right flank. All available vehicles, carts, sleds, and skis were used for this purpose. On the morning of the following day, General Shkrylev's troops, supported by concentrated artillery and mortar fire, attacked on a narrow front. The infantry, by a swift attack from three directions, enveloped the center of resistance in Nikitskoye [not on map], seized it, and came out in the rear of the enemy position at Shchigry. The Germans abandoned their fortifications and to avoid encirclement began withdrawing hastily to the west. Our troops rushed into Shchigry and cleared it after a short but violent street fight. The road to Kursk was open.

On 6 February, the troops of General Cherniakhovski reached the defensive zone on the approaches to the city, and the battle for Kursk began the same day. The approaches and the city itself were defended by the 4th Tank Division, the 82d and 340th Infantry Divisions, and parts of the 323d and remnants of the 57th and 168th Infantry Divisions. Old fortifications were hastily reinforced and new ones constructed. When our units approached Kursk, they had covered in a short time more than 150 kilometers through deep snow, fighting as they advanced. General Cherniakhovski decided to attack the city without stopping and to capture it by double envelopment.

On 7 February, our units overcame strong enemy resistance, broke through the defensive zone, and approached the outskirts of the city.

By the end of the day, two adjacent right wing units (troops of General Pukhov), attached temporarily to General Cherniakhovski's group, came out north and north-

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west of the city (see Figure 2), after a decisive attack and the repulse of several German counterattacks. This was the beginning of the encirclement. The route of retreat for the Kursk garrison was partially cut. At the same time, two other units struck south of

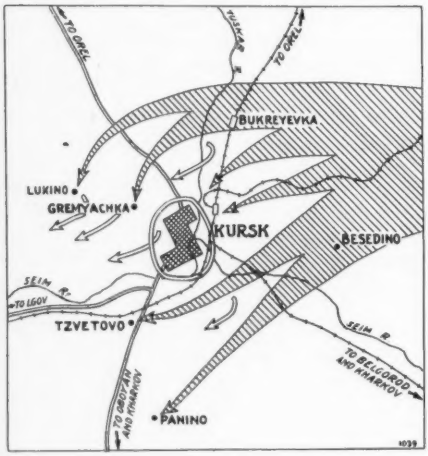

FIGURE 2.

Kursk in order to complete the encirclement in cooperation with the units operating from the north. By the end of the day, one of the units cut the Kursk-Oboyan highway in the sector of Tzvetovo, while the other reached the sector of Panino. By that time the remaining forces had reached the northern and northeastern outskirts of the city. The troops of General Cherniakhovski began the encirclement of Kursk on 7 February, while part of his forces occupied a favorable position for the assault of the city itself.

The city was stormed in the morning of 8 February. The Germans resisted furiously and counterattacked frequently. At 0500, our units broke into the city from the northeast and the east. Stubborn street fighting followed. Our units, launching many attacks from various directions, dismembered, encircled, and wiped out the Germans. The battle for the eastern part of the city lasted seven hours. The railroad station was captured at 1200. In the meantime the outer ring of encirclement around the city was tightening. The units attacking from the north outflanked Kursk from the west and enveloped its northwestern suburbs. Realizing the futility of further resistance and attempting to escape full encirclement, the Germans began withdrawing from the western part of the city. On 8 February at 1500, Kursk was completely cleared of the Germans. The remnants of the defeated garrison retiring to the west and southwest fell under the flank blow of General Golosov's and General Shkrylev's units attacking from Lukino and Gremyachka. The mobile troops of General Cherniakhovski kept right on the heels of the enemy. The garrison of the city was ruthlessly routed. Only a few managed to escape. Kursk became once more a Soviet city.

The great success of the Kursk operation was the result of the extensive use of maneuver, the speed of our operations, and the use of such means of transportation as skis, sleds, etc. The high tempo of the whole operation and the uninterruptedness of the pursuit played a very important part in the success of the battle.

It was characteristic of this operation that, whenever our troops encountered enemy resistance at strongpoints and positions prepared in advance, they avoided prolonged engagements and frontal attacks. After a quick regrouping, part of the forces bypassed such centers of resistance and continued the advance, while the remaining forces attacked the enemy from the rear and flanks.

Whenever enemy positions stretched in long and continuous lines and a deep envelopment would cause loss of time, our units breached such defenses on a narrow front and appeared in the rear of the enemy.

With the capture of Kursk, a huge wedge was driven by the troops of the Voronezh and Briansk Fronts between the Orel and Kharkov German groups. This wedge was subsequently extended by the forces of the Central Front and became known as the Kursk salient. This salient goes down in the history of the great Patriotic War as the site of one of the greatest battles of modern

times—the battle of Kursk, crowned by a crushing defeat of the German army. The Kursk salient bore successfully the brunt of the German summer offensive of 1943, when the Red Army, having stopped the elite enemy troops and having bled them white, shifted to a victorious offensive, which continues up to the present time.

The Decline of the Light Tank

An article by Lieutenant Colonel Kolomeitsev, Soviet Army, in *The Tank* (Great Britain) June 1944.

A GREAT deal has been said and written and argued about the tank since the outbreak of the war, yet comparatively few people are aware of the profound evolution which has taken place in this formidable arm.

At the beginning of the war it seemed that the speed of the light tank made it invulnerable: on level terrain it could do as much as thirty to forty miles an hour. But the lightness of its armor, which could be pierced by any armor-piercing projectile, turned out to be a serious weakness. Moreover, speeds greater than nine to fifteen miles an hour proved beyond its capacity over broken country of the kind in which it was called upon to operate. At that speed a good marksman could easily hit it before it had done much damage.

The light tank became still more helpless after the wide-scale introduction of the antitank rifle. With this weapon the Russian infantry at the end of 1941 inflicted heavy losses on the enemy's light tanks. The Germans had to increase hurriedly their output of medium and heavy machines.

When tanks are employed on a mass scale, head-on clashes of armored forces become a common occurrence. The natural result is that the light tank, with its inadequate armor and light armament has to give way before heavier machines.

It was the Russians who first appreciated the significance of heavier armor and armament. The Soviet T34 and KV tanks were designed before the war. Their thick armor and 76-mm guns coped easily with all types of German machines. True, the Red Army did not have enough of them at the beginning of the war, and the Germans enjoyed numerical superiority. But in time the relation of forces changed in our favor.

The Germans began to use special shells to cope with the Soviet heavy tanks, but that did not help them very much. Our armored machines squeezed from the battlefield not only the German light tanks, but also the medium tanks.

The German heavy Mark VI ("Tiger") and Mark V ("Panther") tanks are described as imitations of the Soviet heavy machines. By increasing the caliber of the gun mounted on the "Tiger," the German designers hoped to give it a range greater than ours, and so put it out of our reach. It was the same "long arm" principle that we had applied in the KV.

The new German heavy tanks made their first appearance in large numbers last year during the battle for Kursk. Since then they have taken part in all major battles in the south in particular. Yet at Kursk and in the south the panzer forces suffered their heaviest defeats of the war.

What had happened? While the Germans had been busy reinforcing their armor and armament, we had been improving the design of our tanks and—just as significant—of our antitank artillery. The fact that the enemy has lost several thousand tanks in the past few months is eloquent enough evidence that the Red Army is technically and tactically superior.

The tanks in use today are medium and heavy machines weighing from forty to fifty tons and provided with thick armor and powerful guns. What could light tanks do against these modern leviathans?

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The light tank has, in fact, lost its significance as an assault arm, and is useful only for auxiliary purposes, reconnaissance, patrolling in the rear, communications. And the armored car has shared the fate of the light tank. Once an offensive weapon, the armored car, too, has been relegated to communications and reconnaissance by light patrols.

Attacking and Defending Populated Places

Translated and digested at the Command and General Staff School from a Spanish article by Captain Pablo Alvarez de Lara in *Ejercito* (Spain) April 1943.

A FUNDAMENTAL principle of defense is that it must always be supported by natural antitank obstacles. For this reason, populated places, being antitank obstacles, must always be organized for defense irrespective of their size and location, and the zone chosen as the battle position should be extended as far as possible to include such places. This is a modification of the idea that existed before the war, which considered populated places only when they were strongpoints of great value in the general defense of the battle position. Today, populated places, because of their antitank character, are always fundamental in the general defense of battle positions.

The value of a locality for general defense is based on its location, the character of its buildings, and its size.

Tactically, a populated place usually has a good field of fire and good observation. Its flanks can be easily protected. It may have an obstacle which will hinder attacking infantry and is, in itself, an excellent antitank obstacle. The buildings and materials used in their construction provide, at times, places of refuge that are proof against everything, and in any case against infantry fire and shell fragments of the artillery.

In order to achieve the destruction of populated places, the fire has to be very accurate. It should be directed at the foundations of the buildings and not at the upper stories, for if this were not done, the debris would serve to fortify the basements and cellars.

The height of the buildings and the narrowness of the streets increase the antitank characteristics of populated places to the point where it imposes a limited choice of itinerary for the tanks.

From the tactical point of view, the ideal size of a populated place is that which corresponds to a population of from 3,000 to 4,000 inhabitants. Towns of too great a size absorb too many troops. Small villages are regular hotbeds for shell fire and prevent adequate density of occupation.

We may consider populated places organized for defense as consisting of two parts: the nucleus, or a compact assembly of buildings and streets; and the edge, not in the lineal sense of the perimeter or line which separates the buildings and the fields but in the sense of a zone of from 200 to 400 meters in depth which serves as the transition between the center of the populated place and the country, and which, as a rule, is made up of isolated buildings such as factories, farm houses, railway stations, cemeteries, sanctuaries or chapels, etc.

When the constituent elements of a populated place are properly organized, the outskirts provide a corona or zone of reaction around it. Depending on the terrain, this zone may attain a depth as great as the maximum range of the infantry weapons. The organized nucleus opposes frontal penetration into the village, and provides the point of departure for counterattacks against the outskirts.

From this first tactical analysis of populated places, we can draw the following conclusions:

1. The great importance of maintaining, in all its integrity, possession of the outskirts. The main line of resistance must be out

ahead of the outskirts or may coincide with them at one or several points, provided the buildings offer the necessary protection, since it is at the outskirts that the most intense of the enemy artillery fire will be directed.

2. In the nucleus or center of the populated place, fortified positions must be organized consisting of successive lines of defense which, covering some of the streets with enfilade fire, divide and separate the city into various sections, because as a general rule, it will not be possible to effect the echelonment of the weapons in depth.

3. In order to prevent envelopment of the populated place, it is necessary to tie the place in with other adjoining strongpoints; that is, to achieve a complete flank or absolute lateral liaison by means of fire between all the strongpoints which constitute the skeleton of the battle position.

4. If, by breaking through the resistance of the troops which defend the populated place, the envelopment of the same is carried out, in order to prevent its total encirclement it is necessary that in the rear of every populated place organized defensively there be established a deep zone which will not only receive the defending forces of the populated place if they are driven out of it but will serve as a point of departure for a counterattack. Likewise, it will help prevent the complete breakthrough of the enemy if he succeeds in occupying the locality.

5. With the defense of the place organized in this form, if the enemy causes the direction of his main effort to pass through it, in order to develop his maneuver he will have to occupy the place or at least neutralize its effect on the adjoining zones.

In order to occupy the town, he will have to:

1. Attack and occupy part of the outskirts;

2. Penetrate frontally into the town, occupying its successive sectors.

In order to neutralize it, he will have to do the following:

1. Attack and occupy part of the outskirts;

2. Continue, by degrees, the occupation of successive portions of the outskirts he is interested in in order to neutralize the effect of the populated place on the adjoining rural area.

In either of the two cases, the enemy has first to occupy part of the outskirts in order to proceed, using it as a point of departure with one or the other of the indicated courses of action. As far as the defender is concerned, therefore, lost portions of the outskirts are always counterattacked starting from the nucleus. This confirms the fundamental principle, which has already been indicated for the defense of populated places, that the possession of the outskirts has to be maintained at all costs and in their entirety.

Summarizing, we may say:

1. Populated places are always strongpoints of great value in defense. They are defended not because they are populated places but because they are important in the general defense of the battle position.

2. It is necessary to tie them in with other strongpoints in order that mutual flanking may prevent possible envelopments.

3. The main line of resistance should pass in front of the outskirts of the populated place. However, it may coincide with them at one or more points.

4. Because of the impossibility of achieving echelonment in depth of the weapons in populated places, successive lines of defense should be organized.

5. In order to maintain complete possession of the outskirts, reserves for counterattacks should be maintained.

6. A position should be established in the rear of the populated place, the purpose of which is to prevent the encirclement of the place, to receive the forces driven out of it, to serve as a point of departure for the counterattack, and to prevent by fire the breakthrough of the enemy if he does succeed in occupying the place.

We can see from the above that a populated place which is well organized and oc-

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cupied by sufficient forces is really a fortress," and that consequently it offers great resistance to the attack if the main effort is directed through it. However, it offers advantages to the attacker as well. If the outskirts of the populated place afford protection to the defender and a powerful system of fire, they also present, on the other hand, a lineal defensive organization of little depth, deficient close-range artillery observation (possible only by locating observation posts in the outskirts) and difficulties with respect to keeping fire close to the outskirts. Furthermore, the antitank obstacle proper is the populated place itself; that is, its nucleus, and not the outskirts which are out in front of the obstacle.

As a result of this, the attacker will proceed with:

1. An intense artillery preparation on the selected sector of the outskirts.

2. An infantry attack supported by artillery, assault artillery, tanks, and assault engineers.

3. As soon as the outskirts are occupied, the attacker will have to secure himself against the counterattacks which will certainly follow. Hence, he will need quick support for the infantry which is occupying the outskirts, reinforced by mortars and assault engineers; artillery support on the nucleus of the populated place and in its rear; and lastly, security of contact from the rear forward, that is, from the point of departure to the occupied outskirts in order to be able to feed the infantry battle which will be costly and intense.

4. Once the occupation of the outskirts has been started, the attacker will proceed to the successive occupation of the outskirts on one side or on both sides of the populated place in order to prevent the effect of the same on the adjoining rural area. The flank attack on the remaining portion of the outskirts is carried out by the infantry supported by tanks, assault artillery, and assault engineers. As soon as the position is consolidated in front of the populated place, the flank attack is started and the outskirts penetrated. When such an outflanking movement is not possible, it will be necessary to make the attack frontally, effecting the occupation of the place by successive sectors. There, the infantry will have no other support than that of the assault engineers.

5. When the populated place has been occupied and the troops are again in the open terrain, it will be necessary to proceed with the exploration of the rear outskirts of the place and, determining the location of the defenders, bring about the fall of the latter by an outflanking movement, avoiding, if possible, the abandonment of the occupied place. If it is impossible to avoid leaving the populated place, tanks are best for its defense.

Conclusions

Populated places are defended and attacked not because they are populated places but because they are important points supporting the general defense of the battle position.

Populated places which are well organized, properly garrisoned, firmly tied in on their flanks with other strongpoints, and supported by reserves constitute centers of resistance capable of withstanding any attempted breakthrough.

A large unit which in its advance encounters a populated place must first of all set foot in the outskirts, and, when it has established itself firmly therein, it must envelop the place, besiege it, and finally clear the enemy out of it. Lastly, if this maneuver is not possible, there is no other recourse than to send the infantry into the populated place in spite of the difficulties and slowness involved in such action.

War is made up of accidents. A general ought not to lose from sight anything which may enable him to profit from these accidents.

—Napoleon.

The French Maquis

Digested at the Command and General Staff School from an article in *The Manchester Guardian* (Great Britain) 2 June 1944.

THE active patriotic movements in the German-oppressed countries are among the outstanding political and military phenomena of this war. These movements constitute today the most advanced expression of organized armed resistance to the invaders and those who collaborate with them. National armies whose total strength probably amounts to well over 600,000 men are waging a war inside Europe which compels the enemy to throw into battle against them the full resources of the police and, in addition, a considerable proportion of the garrison forces.

The French army of active resistance, the "Maquis," as it has come to be called, has only comparatively recently grown into an organization with a nation-wide appeal and giving to French opposition the character of a national mass movement. Laval's introduction of general labor conscription in order to fulfil the demands of his overlords for workers in the Reich was the signal for a revolt of the youth of France. Boys of the twenty to twenty-two age groups, hitherto unmobilized, fled to the hills and the woods and went into hiding to escape the corvée [compulsory labor]. There they joined up with older men, many of them former members of the French forces who had been demobilized by Petain in 1942 and had formed themselves into partisan groups rather than go to work in Germany.

There were constant additions to the number, and today it would be a conservative estimate to say that a quarter of a million men are in hiding. The actual figure is probably considerably higher, although only a proportion of the force is yet properly equipped and formed into units. The Maquis as a whole, however, is subject to special laws of discipline, and its members undergo systematic military training. "Joining the Maquis," a decree of the resistance movement tells volunteers, "involves being ready to give one's life for the country and to suffer for its liberation. It means a hard life, little food, and fidelity to an iron discipline. If you have joined the Maquis there is no way back. Those who leave are looked upon as deserters, and they must die. Should they escape for the time being, they will meet their judgment after the war is over."

The basic unit of the Maquis is the group of ten. Only in certain districts—Savoy, for example—is this number exceeded. In other regions the group arranges its own contacts with the local underground front and with sources of essential supplies. A considerable degree of centralization has already been achieved and rules laid down for the transmission and receipt of orders through authorized channels. In the event of communications being severed, the leader of a unit may act on his own initiative. Training follows an approved syllabus, and courses are held of one or two weeks' duration. At these courses candidates receive instruction in sabotage, "with or without special materials," security, guerrilla warfare in general, and also in the use of firearms. Sabotage and handling of explosives are dealt with very thoroughly. All training ends with an operational test.

Every member of the Maquis is expected to honor a code of conduct drawn up by the Council of Resistance. It is impressed upon him that he is not merely a fugitive from the Germans but an active soldier of the secret army of France. In the plainest terms he is reminded that every article of equipment handed out to him has been acquired with the utmost difficulty, seldom unattended by danger. Most valuable of all are arms:

"The volunteer will not be armed until his endurance, training, and discipline make him worthy to receive one of our weapons, which are rare and therefore precious. He must take the greatest care of his weapon, keeping it always within reach, unless it is in the charge of the camp armorer. Every loss of a weapon is punishable by death. This is a se-

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vere penalty, but indispensable for the general good."

The spirit and atmosphere of a typical unit have been described by a young man who for several months commanded a band having its quarters in a lonely farmstead high up in the hills. His men included representatives of many classes and callings: a student, a printer, a civil servant, a carpenter, several artisans, and a St. Cyr cadet. Apart from himself, none of them had seen active service or received any practical military training other than that given at the Maquis course. Yet all were amenable to discipline and, once their confidence in their leader was established, ready to carry out his slightest order. Living conditions were hard, but the cooperation of the local people enabled them to secure essential needs.

The men of the Maquis fight their own countrymen with full knowledge and responsibility, realizing that in so doing they are fighting the tools of Germany and almost without desire for personal revenge.

A Blasted Cannae

Translated for the Command and General Staff School from a German article by Captain W. Ritter von Schramm dated "East Front, end of April" in *Das Reich* 30 April 1944.

This article is a German account of the escape from encirclement of General Hans Hube's army in the Kamenetz-Podolsk area during the last week in March and the first week in April 1944. On 20 April General Hube was awarded the "Oak Leaves with Swords and Diamonds to the Knights Cross of the Iron Cross," and was killed in an air accident on the following day.—THE EDITOR.

AFTER the escape of the Stemmermann Battle Group from the Cherkassy encirclement in the middle of February, the opposing forces stood facing each other for a while like two wrestlers, breathing hard and collecting their strength. Only at the beginning of March were the Soviets sufficiently recovered from their blows to plan for a new decisive offensive. This was to be a mass attack, as the German High Command perceived from the concentration of Soviet panzer strength. The mass attacks began 4 and 5 March. The centers of gravity were directed towards the Shepetovka area on 4 March, and on the following day northeast from Uman towards the German front, which at that time ran obliquely through the Ukraine. In spite of the enemy's great superiority, the German troops were enabled to prevent the cutting of the main Tarnopol-Vinnitza rail line by successful counterattacks north and northwest of Proskurov. On the other hand, the enemy push from the Zvenigorodka area towards Uman rapidly gained ground. When strong Soviet panzer forces in the course of their deep penetration crossed the Central Ukranian Bug River, a wide gap was opened in the German front. General Hube, then commanding in the Vinnitza area, acted in accordance with the operational intentions of the German High Command against the enemy penetrating on his right flank by establishing a new defensive front towards the east and southeast in order to retreat according to plan in a generally southwestern direction by delivering continually harder counterblows and at the same time drawing his troops in concentrically. Around 20 March, he succeeded in escaping the threatened encirclement or penetration of his flank which curved to the east, and finally anchored this flank on the Dniester. In the course of these operations, Vinnitza and Zhmerinka were evacuated.

In the meantime, another gigantic danger was threatening from the area between Proskurov and Tarnopol. Because of great numerical superiority, the enemy with strong panzer units succeeded in breaking through the German battle groups there. Prevented

by the Tarnopol garrison from pushing through to Lemberg, five Soviet panzer corps, supported by powerful infantry units, rolled forward on 23 March between the rivers Zbruch and Seret towards the south, partly towards Hotin and Kamenetz-Podolsk (Fourth Soviet Panzer Army) in the rear of the main German forces, and partly in the direction of

Chernovitzy. These five Soviet panzer corps were attempting to effect a junction with the other Soviet panzer armies which in the meantime had crossed the Middle Ukranian Bug and were soon afterwards crossing the Dniester at Yampol and Mogilev-Podolsk. Thus by 23 March the main body of General Hube's troops was cut off from its rear services and communications; the enemy had achieved a double cutting-off of strong German forces. It now seemed only a question of time until General Hube's troops would be pinched together, torn asunder, and finally completely crushed and annihilated by enemy superiority.

So on 23 March a dramatic struggle began between the Dniester and the Zbruch in the former Galician-Soviet border area. On the Soviet side, a fanatic desire for our annihilation; on the German side, a burning determination supported by superior morale to hold out or fight to the last breath. The Soviets possessed superiority in men and matériel; we had our old, eternally young soldier spirit and confidence in the human quality of our leadership and men. During these difficult days one of General Hube's assistants coined this maxim: "There are no hopeless situa-

tions, only hopeless men, and no German soldier belongs to that type." The German High Command knew that only a considered plan and forceful action could save the situation. In spite of the encirclement, it was decided to maintain a fluid front and fight a way out, cost what it might.

Since 23 March, the German forces, systematically retreating and, under rigid control, repulsing all enemy attempts to split them up, were concentrating more and more in the area of Kamenetz-Podolsk. At the same time they were holding open a passage across the Dniester with a strong bridgehead. But their last unhampered connection was lost on 26 March when the Soviets also captured Chernovitzy. Although the German troops were now at least 200 kilometers from the nearest German airfield, they could be supplied by air alone. Even the elements seemed to be allied against our encircled troops. Fighting by day and marching by night, they still had to struggle against snowstorms and drifts. Suddenly it began to rain, and the roads became a deep morass. Many a vehicle bogged down in the mud and had to be abandoned.

Like a powerful hedgehog with sharp needles on all sides, the bulk of the German forces, defending towards the north and east, moved forward, using the Dniester as a strong obstacle and as a natural base.

The enemy attacked on the east and north and applied pressure on the west. The advance of his Fourth Panzer Army to the southeast enabled him to occupy Kamenetz-Podolsk and thereby place our troops in an especially precarious situation. But during the course of the next few days powerful enemy panzer forces were defeated, while others were locked up in the city. A strange situation resulted. In attempting to encircle, the Soviets themselves were cut off and likewise had to be supplied by air. Their supply airfield lay quite close to ours. Remaining elements of the Fourth Soviet Panzer Army which attempted to oppose our troops were simply mowed down. During this period the most difficult problem for both the Soviets and us was supply.

Snow came again during the last week in March, and the airfield had to be shifted every day with the forward movement of our troops. Apparently insurmountable difficulties had to be dealt with. General Hube ordered all unnecessary ballast dropped in order to conserve every drop of gasoline for the panzers and self-propelled mounts and thus to carry out the operation as planned. At this time of greatest danger the main question was to keep the troops mobile even at the expense of matériel.

Thus, even after encirclement, our troops successfully maintained their mobility. By continuous counterattacks the enemy was pushed back and penetrated towards the west, while his belated attempts to re-encircle from the north and northwest failed. All this was accomplished in spite of the critical supply situation which even required careful husbanding of infantry ammunition.

On 23 March, a final and crucial decision confronted the German command. Should our troops break out to the west along the Dniester or to the south over the Hotin bridgehead? The south offered the least difficulties and perhaps would have made possible a withdrawal to Rumania. But then thousands of German soldiers would not be available for the defense of the *General Gouvernement* [Poland]. Therefore, according to the decision of the Führer, it was decided to pursue the more difficult alternative of breaking out to the west in order to gain contact with the German front in Galicia, where strong forces were concentrating in the area southwest of Tarnopol. But our troops were still at least 200 kilometers distant from this area, with numerous rivers to cross. Not the slightest impression was made on the German troops or command, however, when the Soviets, counting upon our apparently hopeless situation, demanded capitulation, and finally threatened to shoot every German soldier after the inevitable collapse if we did not surrender.

In the meantime April had arrived. Movements were hindered by heavy rain. But they went on, as if by elemental force. Even while the enemy was demanding capitulation, the

first rays of light were breaking through. The enemy had evidently erred concerning the direction of escape the German troops could choose and did not consider it possible that our troops could force their way directly through his center instead of towards the south. Furthermore, powerful enemy forces were immobilized as a result of the cutting off of their rear communications. Thus we were able to set up bridgeheads over the Zbruch with surprising speed and command the highway to Chortkov. Shortly thereafter, the crossing of the Seret was achieved. But once again the success of the escape seemed endangered when powerful enemy panzer forces attacked towards the north over the Dniester, northeast of Horodenka. However, this attack was also beaten off. In the meantime, German forces were assembling along the Zlota-Lipa from the other side. On 6 April at 1705 hours, advance elements of General Hube's troops finally shook hands with Waffen-SS troops thrown in from the west to the east on the Strypa at Buchach. This signified the successful escape of the bulk of our forces from the deadly encirclement of the Soviets after a difficult fourteen-day struggle. To be sure, rear guard actions lasting for several days were still necessary before our last unit could join the main force. At the same time a new north-south front was established which ran without interruption from the Dniester to Brody, and which halted the Soviet advance.

During the encirclement our fighters never felt that they were being gradually crushed, because they were continuously mobile and attacking, and were supplied by the Luftwaffe even during heavy snowstorms. Our communications with the High Command were not interrupted while our troops, continuously moving, were being surrounded. Even after encirclement, radio communication was maintained. Because of this, the High Command was enabled to exercise rigid control over all the rapidly changing situations obtaining within the encirclement and to execute immediately the necessary assisting measures. Thus it was at no time a question of panic or of deterioration. Also, the number of missing was quite low.

Thus the "Cannae" to which the Soviets had hoped to subject General Hube and his troops not only failed, but, on the contrary, considerable enemy forces were broken up, shattered, and dispersed over a wide area. Because of their tremendous superiority in matériel, the Soviets were able to penetrate into Galicia and occupy large sections of Bukovina, but the real operational object of their powerful winter offensive, to break up the German armies in the southern sector of the Eastern Front, surround them one by one, and destroy them, failed completely.

Training of Officers on the Basis of War Experience

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel V. Smirnov in *Krasnaya Zvezda* 22 April 1944.

THE continuous training of our officers is unthinkable without a systematic analysis of and generalization upon the experiences of the war. This work is wide in its scope and diversified in tenor. It requires a great amount of reasoning and a precise and serious approach to the subject. Otherwise, errors are likely to be made. It is possible, for instance, to accept an exception for a rule, to determine incorrectly the causes of the effectiveness of some tactical method, and to draw erroneous practical conclusions.

Special care in generalizing upon combat experiences is required on the part of the instructors in military schools, lecturers, and men in charge of officer training in the army units. In this respect, the work being carried on by the Red Banner and Order of Lenin Field Artillery School of the Red Army deserves particular attention.

It should be noted that all the instructors of this school periodically visit the front lines. Here they study the various methods of artillery support of operations and gather tactical and firing data which later enable them to approach their subjects intelligently. In the school, the study of combat experiences covers two fields: enemy tactics and matériel, and the analysis of our tactics.

Whenever the enemy's tactics change, the school is soon informed of it, and this is at once reflected in the program of instruction. When, for example, it was learned that the Germans had shifted to trench defense, this was immediately taken into consideration by the school commandant and the chiefs of sections. Soon the officers could study the necessary plans and sketches and listen to lectures on trench defense. Each item of information coming from the front is added to the previously collected data for the use of the personnel and students of the school.

Of utmost importance to the students is the mutual exchange of experiences by the students themselves, most of whom come here from the front. Commanders of batteries, regiments, and artillery staff officers bring with them facts, personal observations, and tactical methods tested in combat.

At first, each student was asked to deliver a talk at the beginning of the course. These talks, however, were not very successful. They were picturesque and original, but too superficial. It was almost impossible to summarize and systematize the information so obtained, and the minutes of the talks contained rather crude and even contradictory material. The artillery officers attending the school come from different units which have fought under different conditions of terrain, climate, and enemy tactics. This, by the way, caused many heated discussions and disagreements.

At the present time, another method of digesting combat experiences is used in the school. This method is based on questionnaires. The information so obtained is reliable and quite suitable for study and application. The questions asked aim to establish what is usual for the unit in which the officer serves, what is practiced less frequently or not practiced at all, and why. The time allowed the students for filling out the questionnaires is such as to enable them to become familiarized with the questions, to think them over, and to answer them without haste.

When to fill out the questionnaire is actually determined by the program of instruction. Before the beginning of a course in a certain subject, the answers of the students pertaining to this subject are collected, and then the plan of instruction is definitely fixed. For instance, in the course in tactics the following subjects appeared to be most troublesome: control of small antitank units in attack, organization of communication during a battle in the depth of enemy defenses, firing on narrow targets, sound ranging, etc. The questionnaires confirmed that these problems required a particularly careful study, and they were given much attention in the plan of instruction.

A critical approach to combat experiences enables the school to determine what methods are underestimated or simply neglected without sufficient foundation by the fighting units. For this reason, the school organizes demonstrations of the effectiveness of one or another tactical or firing method, which prove that the complexity of the given method is only apparent. These demonstrations on the range are of great use to the students. Upon returning to the front, they successfully use the firing methods which formerly they often neglected, such as ricochet fires, the use of instrumental observation, etc.

The close contact established between instructors and student-officers has brought remarkable results also in improving the methods of firing. The artillery units of the army have thus been familiarized with many innovations in the preparation of firing data. Important changes have also been introduced in a series of firing regulations.

An officer had conceived in the course of his battle experience a new method of fire transfers. When he arrived at the school, he discussed the matter with the school gunnery officers. A theoretical basis of his method

was established, and the other artillery officers were soon familiarized with this method. A special instruction was sent to the units.

Thus, the Artillery School gathers and studies combat experiences of its students, transmits them in a generalized form and as soon as possible to the fighting units, and includes them in the program of instruction.

Artillery's Present Place

From an article by Cyril Falls in *The Illustrated London News* 15 April 1944.

In the early stages of the present war many observers came to the conclusion that it would be remembered in tactical history largely as marking the decline of artillery. Its role, they decided, was passing to the aircraft and the tank. These critics based their views upon the campaigns in Poland and on the Western Front. In so doing they failed to take into account the great superiority of the German military machine as a whole. This superiority was so great that it afforded the Germans an excellent opportunity to win the war outright within a brief period, as, in fact, they almost did. But it should have been manifest that, if they failed to do so, then the power of great industrialized opponents—the only foes who could possibly stand up against them—would presently produce a comparative equilibrium in armaments which would profoundly affect tactics and tactical methods. Yet, even taking conditions as they existed in 1939, the critics, owing to an excusable lack of detailed knowledge of events, misread German practice. In the Polish campaign the Germans made most effective use of artillery preparation in the offensive. They relied so much upon it that where they suffered a check, as happened in several instances, they repeated it. The Germans did not look upon aircraft, the artillery of the air, as a substitute for guns, the artillery of the land. They treated the former as a valuable adjunct to the latter, using its superior flexibility and range to engage more distant targets. Leaving defense out of the question altogether for the moment, we may say that German doctrine always allotted an indispensable place to artillery in the offensive.

Nevertheless, it cannot be denied that in that early phase of hostilities, the tank and the aircraft, working on the German side with a coordination which has never since been excelled and perhaps never equalled, "ran loose" over the campaigning grounds of Poland, Belgium, and France. After that, the inevitable tendency came into play. If I may quote a sentence of my own which dates from an early period of the war, "in warfare no new weapon or tactics are ever brought into play without having to meet, and generally to meet soon, a well-reasoned reply." The improvements and increases in antitank artillery made the breakthrough by armored forces a matter of greater difficulty, and this in its turn summoned other natures of artillery to play an enhanced role in the offensive. We saw Rommel in Libya using antitank artillery itself in what was essentially an offensive capacity, attempting, more than once with success, to lure the British armor into costly attacks, and thus preparing the way for the advance of his own armor. Then we saw General Montgomery, at El Alamein and in subsequent battles down to this last offensive in Italy on the Sangro, employ dense artillery concentrations in hurricane preliminary bombardments. So, simultaneously in attack and in defense, artillery began to recover any ground which it may have lost temporarily and to re-establish its ancient prestige. It has now fully regained them both. I myself am a firm believer in the possibilities of the armored fighting vehicle, which I expect to see further exploited, but if I were to be put in command of an army I should be more concerned about the types and performances of my guns than about those of my tanks.

I have spoken of the vast superiority of the aircraft to the gun in flexibility and

range. The gun has an equivalent superiority in accuracy. I know of a bridge which was bombed day by day—I hesitate to say for weeks, but certainly for over a week—without being destroyed, until at length a hit was obtained which removed half the width of the roadway without destroying its structure. The bombing was carried out in daylight and with very little interference from the enemy's air force, though there was defense by flak—artillery again. If the bridge had been within a range of five miles instead of ten times as far off, there can be no doubt that it would have been very much more quickly and thoroughly disposed of by artillery. And if artillery fire be less accurate by night than by day, because in the latter case it can be observed and directed from the ground or from the air, it nevertheless maintains by night its superiority over the aircraft. Moreover, a mass bombardment, which is in either case fired from the map, is as accurate by night as by day. On the Italian front the Germans have on numerous occasions shown themselves more afraid of the little, slow, low-flying artillery aircraft of the Allies, flitting about like moths amid the mountains, than of any other type. They knew that if they disclosed their position to those "eyes of the artillery," a swift and accurate concentration of fire would follow, so they held their fire and hid their faces.

I think it reasonable to assert that the outstanding artillery development of this war is the self-propelled or mobile gun. Early in the war I interviewed an artillery expert on its possibilities. He pointed out the difficulty of obtaining enough stability in any form of truck platform, mentioning earlier experiments with a lorry-borne 18-pounder. I then spoke of a tractor carriage. His reply was: "Then you have nearly got a tank. Why not have a whole tank? It's better in the long run." We now know that he was wrong. The turretless tank chassis will carry a bigger and more powerful gun—or howitzer, if desired—than the tank. It does not confine the vision of the detachment. It certainly will not fulfil the functions of a tank, but though a tank can itself be used effectively as a mobile gun, the self-propelled gun will prove a great deal more effective. In particular, it goes a long way towards solving the problem of long-range support of tanks or any other highly mobile forces in the course of a rapid advance. It may often serve to bridge the gap between the moment at which such support is first required and that at which field artillery can first be brought into action. It is essentially the gun which roves the battlefield, intervenes quickly and with the effect of surprise, and shifts with the minimum of trouble as soon as it begins to attract unwelcome attention.

The development of the antiaircraft gun mostly took place between the two wars, but that of the antitank gun, longer delayed, has been more recent. As tanks were improved in the strength of their armor and the range of their guns, armies sought heavier and longer-range antitank artillery. Yet it would appear that there must always be a limit in these respects, because the antitank gun must be highly mobile. The British Army now possesses in the 17-pounder one of the most powerful tank-killers in the world, but to obtain it, it has gone to the limit in weight and size. Anything heavier would have only very partial uses, and would be unable in all circumstances to give the armor of its own side the necessary close support and protection. Where, however, there are to be seen signs of new development is in the use of guns for antiaircraft or antitank weapons, as demanded by circumstances. Almost any gun used against aircraft is also suitable for use against tanks. The first problem is to find a perfect dual-purpose carriage or mounting. But that is not the only problem, and it would scarcely be possible to find a perfect dual-purpose shell. So two kinds of ammunition have to be carried about if the gun is to be used for two purposes. It may be said that the same problem affects the tank. Some hold that the tank should carry thirty percent of armor-piercing shell, some that it should carry none, on the ground that this shell is of little use against troops in the open, whereas normal shell is useful against hostile

tanks, even if much inferior to the armor-piercing.

Field artillery has changed comparatively little. Its range and hitting-power have been improved, and in most cases, including that of our 25-pounder, it can be used with either the flat trajectory of a field gun or the high trajectory of a field howitzer. What we now call medium artillery, of or about six inches in caliber, has also not altered very much from the "marks" we were using by the end of the last war, but is no less indispensable than then. Heavy artillery has been in great part relegated to coast defense and the siege train, though I am not sure that we ourselves have not gone too far in the matter, and that we do not require more heavy artillery support for our armies. It would certainly have been valuable against both the monastery and the town of Cassino, the latter especially. It might possibly have been stormed section by section, keeping part of it under howitzer fire until the remainder had been consolidated. That is something which cannot be carried out in conjunction with an air barrage, because troops cannot approach it closely enough. There must always be a pause such as will permit the enemy to reappear from underground or even to come in from outside the bombed area.

Within the scope of this article it is not possible to deal with the technical side of what is nowadays called predicted fire, but it may be said that artillery can now be brought into action in a new position, and in country which the detachments have never seen, much more rapidly than was formerly the case. The enormous concentrations of the last war are unusual in this, but they can be made if necessary. In the notorious gully near Ortona, which I visited last January, the ground seemed to have been as completely combed by fire as any space was in the first World War within the same brief period. The rolling barrages can be reproduced when required, though they are less deep, because they lack the weight of the heavy howitzers on their forward edges. But what is called for more frequently is an extremely rapid and heavy concentration of fire upon a limited area. The tempo of warfare has quickened. Artillery cannot now afford to dally too long over calculations.

In short, two things concerning artillery have occurred since 1939. In the first place, what were genuine errors about the importance of its role have been dispelled by experience and by fuller knowledge of what actually happened in campaigns during which some observers thought that it had passed into the shade. In the second place, the special conditions—a Germany fully armed on land and in the air confronting opponents only half armed—have passed away. With them have gone any foundations there may have been for the theory that the artillery arm would no longer be given opportunities such as it had enjoyed in the past. Since it first took its place upon the battlefield it has seen the creation of many new and improved weapons. But it has not stood still itself, and by means of improvement and adaptation it has maintained its position.

Radar

Translated at the Command and General Staff School from a Spanish article in *Ejercito* (Cuba) March-April 1944.

WHEN space was bridged by the wireless telegraph, radio had displayed its first dimension. With wireless telephony, it made its appearance in a new and vast field of service. Television was the next great advance of radio, and now with the announcement of Radar, the miracle of this war period, radio is on the verge of attaining its fourth dimension. With the advent of peace, this innovation will perform many services for humanity in its application to guidance, explora-

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tion, and location in the air, on land, and on the seas.

What is Radar? As yet, but very little may be divulged with regard to this new invention—those things only that have been made public by the military authorities of the United States. But enough is known with regard to its principles and applications to recognize that it constitutes a subject of extreme interest even in this era of portentous scientific discoveries.

The word Radar is formed of the initial letters of "radio detecting and ranging." Radar is the instrument employed by the United Nations for detecting the presence of enemy planes and ships, and the distance of enemy forces. Defenses located on the ground make use of Radar to direct the fire of antiaircraft artillery for bringing down enemy planes concealed by clouds. Other military elements also, such as airplanes and ships, make use of Radar.

The basis of this remarkable apparatus is the electronic valve. Following are the statements of the United States military authorities:

"Radar is one of the miracles that have been made possible by the electronic valve. The ultra-high-frequency waves, traversing space with the speed of light, can be focused for the purpose of exploring the air and sea. On encountering a boat or plane, they are reflected back to the point of origin. Radio waves are transmitted with a constant velocity of 186,000 miles per second. Therefore, the signals require very little time to reach a surface and return to a receiver. Hence, when there exists some method for measuring the elapsed time, the distance of any given object can be determined. Radar operates through fog and storms and in darkness the same as when the sky is clear, and is therefore more efficacious than telescopes or acoustic apparatus."

The returning waves are measured in such a manner that, by means of a complicated series of calculations, it is possible to determine not only the position of enemy boats and planes but also the direction in which they are traveling and their speed, and pursuit forces can be immediately notified.

The English, who give to their similar apparatus the name of "radio locator," say that this contributed materially to the saving of England during the attacks of 1940 and 1941. These instruments located the German planes long before they arrived at the zone of attack, giving time for the ground defense and the Royal Air Force to prepare themselves for repelling the attackers.

Radar, employed both in defense and offense, has maintained guard at many points of danger along the frontiers of the United Nations and on the seas. Giving warning of the approach of enemy planes and ships, it first played a role of vital importance in frustrating the attack of enemy forces, and since then has helped to put the conquests of the Axis in reverse.

The invention of Radar cannot be attributed to any single man, for, during the four decades before its application to war, numerous men of science had conceived of and tested various arrangements and circuits which led up to its present state of development.

According to official statements, Radar was discovered in 1922, when research scientists observed that the reception of a radio station was interrupted by an object in motion in the path of the signals. It was noticed that certain radio signals were reflected by steel buildings and metallic objects and that boats passing through the space between transmitter and receiver caused a certain interference with the signals.

"In view of this," adds the informant, "a receiver was set up on the bank of a river and the effect on the reception of signals produced by the passage of a boat was studied. Also, an experiment was performed in which a receiver was installed in a truck, and it was observed that similar disturbances occurred on passing in front of large buildings. The phenomena were immediately studied more at length with the idea of making use of the new discovery to detect the movements of boats through narrow passages in basins and ports and between ships on the high seas.

"Up to that time, it had been necessary for the object in motion to pass between the transmitting and receiving apparatus to register its presence. This naturally limited the field of application of Radar. In 1925, it was discovered that the surface of an object acted like a reflector of the high frequency radio waves. In other words, it was possible for the signals emitted by a radio transmitter to meet a given object and bound back to the transmitter; hence, the transmitting and receiving apparatus could very well be installed in the same place.

"By 1930, research scientists had succeeded in registering signals reflected by planes flying above them. By 1934, they had won recognition for their work in Radar research and had a very definite objective."

The improvements introduced in Radar since that time have enabled this invention to be employed with great success by the armed forces of the United States, Great Britain, and others of the United Nations.

There is no doubt that Radar will be of great benefit to humanity in the peace era. One of the applications of Radar will be that of avoiding collisions between ships at sea. In commercial aviation, Radar will enable the pilot to "see" through the darkness of the night, through clouds, fog, and other atmospheric conditions.

Radar will indicate to the pilot of a plane his distance from a dangerous mountain and even give him an approximate idea of the configuration of the mountain. It will enable him to make blind landings in inclement weather. Traveling over the ocean, a pilot by the use of Radar can easily determine his distance from the nearest point of land.

Radar closes, in these present days, the first chapter of an epic poem written by the imagination, the knowledge, and the skill of the men of science of the United States and Great Britain and the personnel of the Army and Navy who collaborated with them. Tomorrow, there will be written a new chapter relative to the services of Radar in the security and comfort of a world at peace.

The German "Panther" Tank

Translated at the Command and General Staff School from a German article by Werner Uhlig in *Völkischer Beobachter* 27 June 1944.

THIS war has shown that engines of warfare must, of necessity, undergo constant improvement as a war continues. Weapons which at the time of the French campaign of 1939 represented the last word of the German arms industry have since that time been greatly surpassed by improved forms. These improvements are especially obvious in the case of our armored arm. When, for example, we compare our armored scouting cars and light tanks of the western campaign with our heavy modern "Tiger," we are able to see what great developments have been made during this war in the field of equipment. This "Tiger" tank, with its 88-mm cannon and its terrific shock force, has proved its great value in reinforcing the attacks of our infantry on the eastern, on the southern, and

on the invasion fronts, even in the estimation of our enemies.

And now the German arms industry has developed a new medium tank that has al-

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ready been in action for months and has given an excellent account of itself. While the "Tiger" was being produced, a "Panther" tank commission was established at the instigation of Reichsminister Speer. This commission was given the assignment of designing another medium heavy tank and of making preparations for its production. It is the chief peculiarity of German weapons that they are not built on the drafting table but are based on the lessons learned by experience and on the knowledge of scientists and construction engineers, and that they are given new form from time to time in accordance with the requirements of the front.

The qualities of a tank are dependent on four essential factors: fire power, mobility, handling qualities, and armor protection. If it is necessary, therefore, as in the case of the armored scouting car, to make the tank mobile, this mobility is obtained at the cost of fire power. And vice versa, the heavy tank that is provided with greater fire power will be slower. The construction of the "Panther" is, therefore, the more remarkable since in addition to its great fire power it has astonishing speed and relatively safe armor protection.

The "Panther," which is about fifteen tons lighter than the "Tiger," is provided with the same motor and possesses a correspondingly higher speed. It is far superior to the Soviet-Russian T-34 with a speed of forty-eight kilometers per hour, and to the American "Sherman" with thirty-eight kilometers per hour. The armor of the "Tiger," which is 100 millimeters thick, is twenty percent thicker than that of the "Panther," but the penetrating power of enemy projectiles is reduced by the "Panther's" sloping surfaces.

In addition to the 75-mm gun of the "Panther," the five-man crew has machine guns in both turret and bow for close-range fires. Although the gun of the "Panther" is smaller than that of the "Tiger," yet owing to its long barrel and the use of certain types of projectiles the same penetration is secured. Through the strength of the armament and the greater range of the guns, the distances involved in tank battles have been increased, and the "Panther" is able to obtain sure hits at 2,000 meters.

Externally, the "Panther" differs from the "Tiger" in its sloping walls. As a result, the room in the interior of the tank is reduced. A look into the interior shows, however, that by the most careful economy of space, a sufficient supply of ammunition is assured. Good springs and a well-balanced chassis assure excellent observation and accurate fire even at high speed. Its armor protection is increased by additional armor plates over the running gear. A protective coating of special paint makes it impossible to attach magnetic mines to its surface.

The "Panther" is constantly being supplied in great numbers to the front and to the homeland. In conformity with the instructions of Reichsminister Speer, mass production of it is being carried on at full speed. But that does not mean that the production of the "Tiger" has been reduced or stopped. Both types, as the leading weapons of the German tank production, have special tasks assigned to them. In their construction, armament, and ability, they show themselves superior to the Russian T-34's, the American "Shermans" and "General Lees," and the English "Churchills." In the estimation of Russian engineers taken prisoner by the Germans, the German "Panther" is considered the best tank in the world.

Pursuit

Translated and digested at the Command and General Staff School from a Russian article by Colonel M. Mazalov in *Krasnaya Zvezda* 29 April 1944.

PURSUIT usually follows the breaching of the enemy's defense zone through its entire depth. It may also start when the enemy begins a forced withdrawal due to the pressure

of our units on his flanks. The enemy attempts to disengage suddenly, mostly at night, in order to retire to another terrain line under the cover of the rear guard.

Our Regulations require that unit commanders start the pursuit on their own initiative and immediately report their action to the senior commander. Delays and indecisiveness are inexcusable.

The commander should maintain a tempo of operations which would enable him to strike the enemy as soon as his intentions to disengage are known. At this time the defenders lose the ability to offer organized resistance, and our troops should take full advantage of this situation.

If the enemy manages to begin his withdrawal, the mission of the advancing units is to overtake his main forces and to defeat them. The action against his rear guards alone should by no means be considered as sufficient. The Germans detail as rear guards from one ninth to one third of their forces. The rear guard is used to delay our advance in order to enable the main German forces to elude our troops. Enemy rear guards usually occupy key positions which cover effectively the routes along which the enemy retires.

It is quite obvious that the pursuing units should by all means avoid engagements with the rear guards, because the success of the operation depends on the rout of the main forces. One of our tank units which operated in an important sector of the second Ukrainian front usually bypassed enemy rear guards, surged rapidly forward, and unexpectedly hit the retreating columns of infantry and trucks loaded with equipment and supplies.

It is characteristic that the commander of this unit forbade his tank crews and the tank-borne infantry to halt and engage enemy rear guards. "Do not lose a single minute," was the slogan of the tank troops. They always hurried to the rear of the retiring main forces, opened fire on them, and produced panic among the Germans. The enemy did not have time enough to disperse and suffered heavy casualties.

This does not mean that the enemy rear guards should be left alone. They should be crushed by all means, but this action should be calculated so as not to slow down the tempo of the pursuit, but, on the contrary, accelerate it. In the above case the rear guards were annihilated by the infantry units detailed from our main forces.

This example shows that the high tempo of movement is very important in pursuit operations. It should exceed the tempo of the enemy who tends to elude the blow. Otherwise the attacking forces would not pursue the enemy but merely hurry him along a little or accompany him. Such an action merely gains territory, while decisive success can be attained only by the rout of the main forces.

High tempo is the basic prerequisite of a successful enveloping maneuver in pursuit. In order to encircle the retreating units, it is necessary to outrun them in reaching the tactically important points in the rear and at the flanks. The best form of pursuit is, of course, parallel pursuit. It is conducted either on one or on both flanks of the retreating enemy columns. One of the most important tasks of parallel pursuit is the occupation of the main routes in the rear of the enemy and denying their use to his retreating forces. The ultimate aim of these operations is encirclement. The pursuing forces operating on one or both flanks attack and compel the enemy to abandon the road and to accept a battle in disadvantageous terrain conditions. The success will be still greater if it is possible to occupy favorable positions in the enemy's rear and to attack him from there.

It is very important to take into account natural obstacles in the zone of pursuit, against which the retreating enemy forces could be driven and crushed. In one sector of the front there were several rivers along the route of retreat of the German troops. Although the rivers were not wide, they were deep and had steep banks. Our advance units composed of mobile troops reached these rivers first and captured the crossings. As a result of this, when the enemy approached the crossings he found himself under a double blow of the advance units and of the pur-

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suing infantry. The Germans dispersed along the bank looking for new crossings, but our infantry and artillery hurled them into the water or finished them off on the bank.

On one of the sectors of the front the enemy was forced to withdraw. He tried, however, to conceal the withdrawal. The Germans intensified their fires, began mining the approaches to their lines, etc. In some sectors they launched strong counterattacks. One might think that the enemy was not only determined to defend his positions, but intended to attack.

The experienced eye of the unit commander noticed, however, some other signs revealing the real intentions of the enemy: his heavy artillery was silent; prisoners of war taken during this day had a great amount of food in their knapsacks; and when our scouts advanced, the enemy combat security unit located on the commanding hill opened fire at maximum range. The enemy was definitely nervous. Doubtless, the Germans intended to withdraw.

The commander of the unit anticipated this possibility. He immediately moved forward his tank units and groups of submachine gunners. This was done under the cover of our artillery fire. These units were ordered to come out in the rear of the Germans and to cut their communications. But it was necessary, first of all, to crush the enemy rear guards which remained in the position to cover the retreat. This mission was accomplished by strong groups of submachine gunners carried in trucks and tanks. They attacked frontally and pierced the position defended by the rear guards. Then the tank units rushed in.

All this was accomplished rapidly and with precision due to the fact that the commander had anticipated the possibility of the enemy's attempt to withdraw secretly. The Germans wanted to fool our unit, but were taken by surprise themselves. Their rear guards were rapidly smashed, and our advance units, bypassing separate centers of resistance, started the pursuit along parallel roads. Their action produced disorganization within the enemy columns. Due to the rapid tempo of operations, the enemy was unable to entrench in intermediate positions.

The following episode, which stresses once more the importance of driving the enemy away from the main roads during pursuit, is worth mentioning. A column of main enemy forces encountered one of our mechanized units, which managed to straddle a highway in the enemy's rear. In the course of the engagement that followed the Germans were driven away from the highway. Soon our main forces appeared. The enemy was surrounded and defeated.

In conclusion, let us stress the importance of personal initiative and audacity on the part of the officers in pursuit operations. When the hostile defenses are pierced and the troops find themselves in the wide open spaces of the operational depth, a situation is created which is very favorable for effective action against the enemy. All commanders should keep in mind that the supreme purpose of pursuit is the rout and the destruction of enemy manpower, equipment, and supplies.

British Weather Service

Digested at the Command and General Staff School from an article by E. Gold in *The Army Quarterly* (Great Britain) January 1944.

METEOROLOGY in the present war has broadly similar applications to those of the last war; but there are three aspects in which the degree of importance has materially changed. They are (a) the character of land warfare has become more mobile—this introduces new meteorological requirements and modifications in the organization for meeting both the old and the new requirements; (b) the land warfare has become more closely connected with the air warfare —the meteorological requirements for an

operation are more stringent, both air and land requirements must be simultaneously met, and in some operations at least naval requirements have also to be satisfied; (c) "independent" air operations have a prominent place—are indeed a major factor in the war. It could indeed be said that the major, though by no means the only, importance of weather in the present war has been in connection with air operations—bomber, coastal, fighter, ferrying (a wide term covering short delivery flights at home and in other areas and long delivery flights across oceans and continents), transport, training, and experimental research. Even such naval occasions as the *Bismarck* and the *Prince of Wales* were influenced by the weather mainly through its provision of cover—or lack of cover—from air observation.

The Meteorological Office

The organization which provides the Royal Air Force and the Army with meteorological information and advice is the Meteorological Office of the Air Ministry—its officers are known generally as "Met."—an economic and expressive abbreviation for Meteorological Officer. It is a meteorological service spread throughout the Empire and in all the theaters where the Army and Royal Air Force are operating—centrally controlled in its broad aspects but with a large measure of decentralization—in each theater of operation there is a Chief or Senior Meteorological Officer responsible in his area for the operation of the service. The office is also responsible for meeting the meteorological requirements of civil aviation at home and overseas and for the meteorological instruction of the Royal Air Force. The Ministry of Supply and the Ministry of Home Security also look to the Meteorological Office to meet their requirements.

Organization—The Scientific Basis

In order to understand the organization of meteorological service for the Army and Royal Air Force a knowledge of, or at least an outline of, or the scheme of, observations and their object is necessary. It may be said at once that the purpose of these observations is not primarily to enable the meteorologist to give a picture of the weather over the area at the time the observations were made (though that is important), but to enable him to predict what the distribution of weather will be some time ahead and how it will change (or not change) during the period of an operation.

The principal elements which are observed and reported are pressure (barometer), temperature, humidity (or amount of water vapor), wind direction and speed, visibility (or transparency of the atmosphere), cloud (forms, height above ground or above sea, and amount of sky covered), "weather" (rain, drizzle, snow). These observations are all made at ground-level: they refer to the time at which they are made but their variation during the preceding hours is also observed and reported. They are made at most airdromes and at a number of key positions, mainly on the coasts, to give a good network of observations over the whole area and to give it at short intervals of time—the standard interval is now three hours with shorter reports hourly or at any time when a marked change occurs.

Further observations of temperature, humidity, and wind are made at different levels in the atmosphere at a smaller number of places—these are obtained either from aircraft or from "radio-sondes," instruments, carried by relatively small balloons, which emit radio-signals controlled by the barometer, thermometer, and humidity elements and therefore giving the level, the temperature, and the humidity. The wind is determined from the "radio-located" position of the balloon.

Last, but by no means least, is the "weather patrol." This is a special organization of reconnaissance aircraft whose function is to fly outwards from the British Isles—or other lands—and make technical meteorological observations. In peace time there were meteorological aircraft on which observation of temperature and humidity at different heights in eastern England and Northern Ireland were made daily, but these observations were made—intentionally—as nearly as

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possible vertically over the respective airdromes. Now, partly to fill the gaps made by the suppression of reports from enemy and enemy-occupied countries and from ships at sea, and partly to extend the area from which observations at different heights are available, the flights go outwards for many hundreds of miles and the reports provide information of the temperature, weather, and cloud along the routes flown and of temperature and humidity at different levels at selected points of the routes.

The Central Forecast Branch

Just as the scientific basis is broadly independent of the service—Navy—Army—Air Force—for which meteorological information is required, so also is a section of the organization which is designed to serve all these services—the Central Forecast Branch (CFB) of the Meteorological Office. CFB is the nerve center of the organization—and its responsibilities are not confined to the United Kingdom (though it is there that they are most evident and most concentrated). CFB "feeds" services wherever they may be, and it develops methods of progress in practical forecasting.

At CFB the reports of observations are collected and distributed. The observations in the United Kingdom come by teleprinter. Reporting stations are "grouped," and at the center of each group the individual reports are collected and transmitted as a single message to CFB. Here they are received as a perforated strip. This strip is fed into a high-speed broadcast teleprinter which transmits to all the receivers in the meteorological teleprinter network—which includes the meteorological stations of the Army and Royal Air Force throughout the United Kingdom as well as shore stations of the Navy and the stations of the United States Forces in the United Kingdom. By this method the standard observations for the whole of the United Kingdom are being transmitted to all recipients within ten minutes of the completion of the observation, and the whole transmission is completed in about twenty minutes.

Reports from outside the United Kingdom are collected by W/T [wireless telegraph, radio] or by cable in secret cypher, and these are also broadcast on the teleprinter network though not with the same speed as the observations in the United Kingdom.

The second function of CFB is to analyze the information received; and derive from it the course of future developments and their significance for the weather for the whole Atlantic and European area of operations and in particular for the British Isles and surrounding areas.

In addition to the analyses and forecasts mentioned, CFB issues also by teleprinter—or in cypher by W/T—isobaric charts for sea-level and the contour charts for different pressure levels mentioned above—by a conventional method of specifying points on the isobars or contour lines. These charts are forecasts—i.e., they refer to a time some hours after the time of issue. CFB issues also warnings of gales, fogs, frost and snow—supplementary to or in emphasis of the routine forecasts. These services, as already mentioned, are designed to enable the forecasters with the Army, Navy, and Royal Air Force and with the United States Forces to meet the demands made upon them for meteorological information and advice.

The Royal Air Force Branch

It will be clear from the preceding account that the needs of the Royal Air Force cannot be met by providing units or formations with meteorological officers who use their instruments like a doctor uses his stethoscope and his drugs and from their indications provide the necessary information. It is not so clear that the needs cannot be met from a center with experts in adequate numbers to deal with the different areas.

Consequently the organization of the Royal Air Force branch is a decentralized but coordinated one. Meteorological officers, or rather meteorological teams, are allotted to commands, groups, and stations to give advice on the basis of their own knowledge and training and of the information and

guidance which they receive from their center.

Naturally the meteorological service is a twenty-four hour service—weather and operations go on day and night: and in any case the meteorologist must have a continuous series of observations and charts—day and night—to enable him to give the best advice.

Some of the application of meteorology to air operations may be indicated.

Wind at Different Altitudes.—Winds up to two hundred miles per hour are found at great heights, but these do not, in the jargon of the journalist, "rock the aircraft"; their effect is on its course over the ground. A hundred-mile-per-hour wind adds two hours to the time to Berlin and back for a two-hundred-mile-per-hour bomber—he does not gain on the swings what he loses on the round-abouts—for every hour gained one way, two hours are lost the other way: and a cross wind is not negligible, but is half as bad as a head wind.

Pressure at Different Altitudes.—The altimeter tells the pilot how high he would be in a "standard" atmosphere—his actual height depends upon the actual pressure at the place over which he is flying and the temperature in the column of air beneath him.

Cloud is of outstanding importance—it may be helpful over heavily defended areas at night—it completely prohibits high-level precision bombing or photographic reconnaissance by day.

Visibility is perhaps most important of all, both for bases and for targets. An aircraft cannot wait at anchor until the fog clears before it enters port—it must have a fog-free port to land at. "Met." provides the necessary information whether it be for a trans-Atlantic flight or for a returning bomber or for a night fighter.

The operations of Bomber Command—and similar operations in other theaters—are those for which the importance of weather information is perhaps most outstanding. It is required both by those who plan and order the operation and by the air-crews who carry it out. The necessary coordination is effected in part by the general guidance from the center and is completed by a telephone conference in which the "Met." officers at Bomber Command and at the Bomber Groups and the "Met." officers at CFB agree on the meteorological information relevant to the planned operation.

The meteorological organization for the Metropolitan Air Force, Bomber, Fighter, Coastal, and Training Commands is not very directly concerned with overseas services in the Dominions and Allied countries. But the organization for the Royal Air Force Transport Command is very directly concerned—particularly with the meteorological service of Canada which organized the arrangements for the western end of trans-Atlantic flights before the entry of the United States into the war. These arrangements, with the complementary arrangements in the United Kingdom organized by the Meteorological Office, have worked so well that, though they have now been extended by the participation of the U. S. AAF in the scheme, the original plan still forms the main basis of the trans-Atlantic meteorological organization and is a pattern for all similar long-distance routes.

The Army

The meteorological organization for the Army is broadly on similar lines to that for the Royal Air Force—a decentralized organization with meteorological officers at army and corps headquarters and with lower formations—artillery, sound ranging, and "smoke" which have special meteorological requirements.

The principal function of the officers at army and corps headquarters are:

(a) To advise the headquarters staff about existing and future weather—to get these staffs meteorologically-minded so that they do not do things which fail and then blame the weather—they make their plans to fit the weather. Moreover, they use the meteorologists' knowledge and fore-knowledge not only negatively—they keep on the alert to *take advantage of weather opportunities*—planning beforehand so far as possible—so that when the opportunity is seen by their meteorologi-

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cal adviser to be coming along, they seize it. For this purpose it is clearly essential that the staff should consider what operations can be executed in different types of weather—fog, rain, snow, frost, gale, cloudless, cloudy—and consult with the meteorologist about the weather opportunities which may come so that they do not waste time planning or training for opportunities which are unlikely.

(b) To look after the meteorological stations at lower formations and units and see that they are rightly placed and supplied with information and guidance.

The use of meteorology to the Army depends vitally on communications. In static warfare, given the necessary priorities, the communication problem can be satisfactorily solved. But in mobile warfare it becomes much more difficult—firstly, through the necessity for not making presents to the enemy of information he would dearly like to have.

The most obvious—now—and continuous use of meteorology in the Army is with the artillery. Theoretically the information can be obtained on the spot—actually a combination of central guidance and local observations is the practicable solution—particularly for heavy artillery for which winds at high levels are of outstanding importance and for which the effects of temperature are substantial. For short range—or rather, short times of flight—local observations, when conditions of weather and place permit them to be made, provide the necessary information for immediate application. Further, weather or other causes may render local observations impossible and central information must then be used.

Similar considerations apply to the provision of meteorological information for sound ranging.

The outstanding importance of coordination with the air arm makes all the weather which affects that arm of similar significance for the Army.

Signal Communication of Infantry Division in Combat

Translated at the Command and General Staff School from a Russian article by Major General A. Strelkov, in *Svyaz Krasnoy Armii* (Signal Communication of the Red Army) August 1943.

The organization of signal communication within a large unit engaged in offensive operations is usually referred to, in Soviet Russia, as "communication for cooperation." This literal translation of the Russian term is used throughout this article.—THE EDITOR.

IN organizing communication for cooperation within an infantry division in combat, all agencies of signal communication at the disposal of the division chief of signal communication are employed.

Wire communication is used in the area of departure for communication with infantry, artillery, tanks (before they are committed), aircraft (or airfields), and with adjacent front units.

Mobile means of communication, as well as the radio, are widely used by cooperating units during all phases of battle. Single armored cars, tanks, and even groups of tanks are used on the battlefield for communication with mobile units.

Visual and sound communication is very effective. Rockets, tracer bullets and shells, colored smokes, flags, panels, etc., serve for target indication, mutual recognition, transmission of different orders, etc.

In addition to the above, to secure proper cooperation there should be a timely exchange of liaison officers by the cooperating units. They should, by all means, be supplied with radios.

Communication between the *infantry and artillery* is secured by the following:

1. Personal contact among the commanders of both infantry and artillery units. This is attained by the use of joint command posts

for the commanders of infantry regiments and battalions and the commanders of the direct support artillery.

2. Forward observation posts of artillery battalions and batteries are located close to the observation posts of infantry company commanders and are displaced simultaneously. Artillery observers from the forward observation posts inform their commanders about the situation of the infantry and the tanks.

3. Radio, and wire laid by artillery units and stretching from the command post of the commander of the artillery groups to the command posts of infantry regiments and battalions.

4. Simplest means of signaling.

Cooperation with tanks is established by a series of preparatory measures, which are taken by the staff of the division before the operation. For closer coordination of its work with the infantry during the battle, the staff of the tank unit sends its representatives—liaison officers—to the staff of the division and to the regiments making the main effort. In most cases, these officers will have

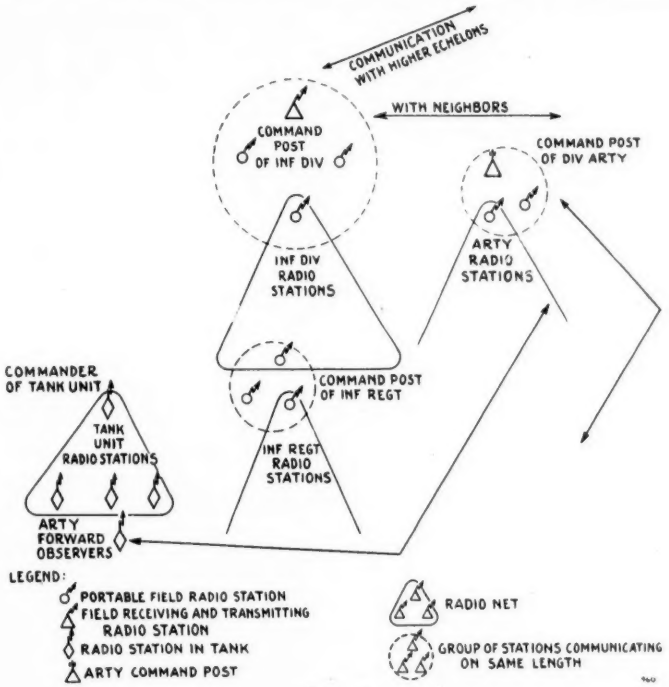

FIGURE 1.

tanks equipped with radios operating on the wavelength of the senior tank commander.

Special radio stations in the division and regimental command posts work in the network of the tank unit. Finally, signals are worked out to be given by means of rockets, tracer shells and bullets, tank sirens, etc.

The organization of communication between *the artillery and the tanks* is similar to that between the infantry and the tanks.

The division signal officer must pay special attention to the organization of radio com-

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munication. The basic principles of this organization will be as follows:

1. Communication between the commander of the infantry division (unit) and the tank commander is established on the wavelength of the tank net.

2. Forward artillery observers ride in the radio tanks of the first tank echelons and are in direct communication with the commander of the supporting artillery, using the artillery wavelength.

3. The senior artillery commander should have at his observation post a radio station operating on the wavelength of the tank commander's net.

Thus, the division signal officer should clearly understand that the communication for cooperation among the tanks, the infantry, and the artillery will be secured only when the radios of the commanders of the infantry and artillery units form a part of the tank commander's net. This will enable the tank unit commander to command his unit by radio on a definite wavelength and to maintain communication simultaneously with the infantry and the artillery without retuning his radio.

Thus, radio communication for cooperation within an infantry division is established, basically, on the wavelengths of the tank units, which excludes the necessity for the organization of separate radio nets for cooperation (Figure 1).

Communication between the infantry division and the aircraft is secured by sending a representative of the aircraft to the command post of the division. The representative arrives with his own means of communication. Most frequently, he has a mobile radio station, which maintains contact with the airfields and the planes in the air. In addition to this, communication with the planes in the air is maintained through the "control post," which is organized by the infantry division and is headed by a representative of the aircraft. The control post is located at a distance of from ten to twelve kilometers from the command post of the infantry division and in locations offering good visibility on the ground as well as from the air. The control post is connected by telephone with the command post of the infantry division. The control post should be supplied with the following means of communication with the aircraft: radio, signal panels, and the simplest visual devices such as rockets, signal lamps, and smoke cans. Communication with the airfields of the supporting aviation is maintained by wire through the headquarters of the corps (army) (Figure 2).

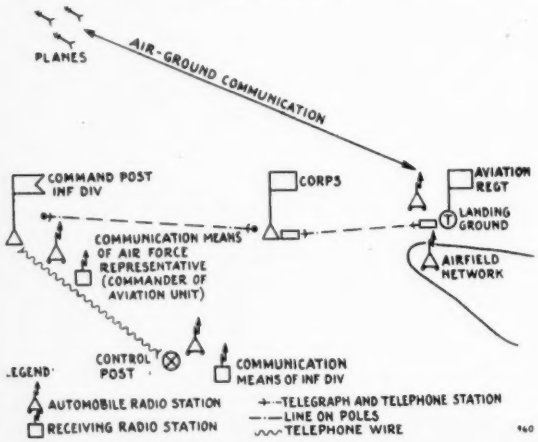

FIGURE 2.

In the course of the preparation for battle, the staff of the infantry division and the staff of the aviation unit work out their signals, such as "am friendly plane," "show forward edge," and the means of indicating the forward edge by the infantry, the location of the tanks, etc.

Should the aviation be placed directly under the commander of the infantry division, the commander of the aviation unit with a group of his staff officers will be stationed at the com-

mand post of the infantry division. Their means of communication will be organized in the same way as it was indicated above.

The organization of communication with the aviation may have certain variations depending only on the availability of radio equipment. Figure 2 shows that at the command post of the infantry division, the aviation representative should have one receiving and transmitting set and a supplementary receiver. The control post should also be supplied (by the infantry division) with one radio set and a supplementary receiver. However, when the number of radio sets is insufficient, certain simpler variations in the organization of communication may be used:

1. The command post and the control post are provided only with one radio set each, without the supplementary receivers. In this case communication is maintained either with the airfield or with the planes in the air.

2. There is a radio set and a supplementary receiver at the control post only. In this case the commander of the aviation unit (the representative of the aircraft) will use for communication with the aircraft the radio station of the control post, since no radio station is available at the command post of the infantry division.

3. When supplementary receivers are not available, the communication with the airfield and with the planes in the air may be maintained on the same wavelength.

To receive aerial reconnaissance data, a special radio is used in the command post of the division. This radio uses the wavelength of the aerial reconnaissance.

In addition to this, the fliers, on their way back, may drop pennants with their data. In this case, the command post of the infantry division should take care of picking up these pennants.

Such are the main principles of the organization of communication for cooperation within an infantry division.

Assault Guns Are Not Tanks

Translated at the Command and General Staff School from a German article by 1st Lieutenant Lutzow in *Artilleristische Rundschau* April 1944.

THE present assault guns continue the tradition of the infantry accompanying batteries of 1918, whose courageous artillerymen with their light field guns valiantly advanced with the waves of the attacking infantry, unlimbered in a hail of bullets and, at short range and with aimed fire, poured their shells into the ranks of the enemy. They were imbued with one thought only—to break the way for the infantryman and help him in his advance.

The present war has called defense weapons onto the scene which, with their power and rate of fire, possess almost complete domination over the area in front of the defender. This naturally has made the employment of infantry accompanying batteries as in 1918 an impossibility.

The grenadier's chances of reaching his objective in his attacks and of effecting a penetration of the enemy's lines have become more and more diminished as a result of modern defense weapons. It was necessary, therefore, to develop a weapon which, like the accompanying artillery of World War I, would eliminate the especially dangerous and fateful stretch of ground where one's own artillery can no longer help but the enemy's weapons are particularly effective at the moment just before the penetration in which the infantryman is left entirely to his own resources.

Thus, there arose the demand for a modern infantry accompanying gun. The requirements which the new weapon had to fulfil were the following:

1. Ability to travel off the roads in order to be able to follow the infantry anywhere.

2. Great fire power and high rate of fire in

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order to be equal or superior to the heavy weapons of the enemy.

3. Sufficient armor to protect the crews at their guns as much as possible.

It was of great advantage that the artillery, which was assigned the task of creating the new weapon, was able to make use of the technical lessons learned by the armored arm. The unmodified chassis of a certain type of tank was adopted. That is why the assault gun, as the present infantry accompanying gun is called, looks very much like a tank and, in its external form, differs from it only by the fact that it does not possess a rotating turret. As great as is the outward resemblance between the tank and the assault gun, the missions of the two are wholly dissimilar, and so are the tactical principles of their employment.

The tank, in formations which differ in strength and composition according to the situation and task, attempts, independently and without regard for what is on the right or left, to attain an assigned operational objective which is often of great extent. In these operations it is not usually the purpose to attack and utterly destroy the enemy positions that are located in the area ahead of the assigned attack objective. It goes without saying that there are often situations today where tanks attack in close cooperation with antitank grenadiers and operate for them as steel battering rams. It should, however, be clearly understood that in such cases the tanks are departing from their original purpose. Their proper employment is an independent one.

On the other hand, the assault gun is definitely an auxiliary weapon of the infantry. Its task is fulfilled when, by its help, the grenadier has reached his attack objective. A tank formation rolls forward and fights to protect itself in order that it may fulfil its tactical assignment. An assault gun must shoot its way forward and fight the enemy to enable the grenadier to fulfil his mission.

Just as tank formations often depart from this rule, so also assault guns may be used in a different manner in special cases.

How does it happen that victories could be reported during the last year, which saw us on the defensive almost everywhere on the eastern front, while theretofore the talk has been of the assault gun as a weapon of offense only? In reply to this it may be said that assault guns operate in mobile defense while in a counterthrust or counterattack they hurl back the attacking enemy when he has already penetrated into our position. Thus we find that in this case the combat that the assault guns so successfully support is conducted as an attack. They are, in common with the grenadiers, the wagers of the actual defense combat.

That assault guns knocked out great numbers of tanks under these particular circumstances testifies to the high combat value of their crews and the excellence of the weapon. The destruction of tanks, however, is not the main purpose of their employment. Rather the main reason for their employment, as seen by the artilleryman, is that they are the most important weapon of the infantry, its faithful helper in all situations. In other words, they take a hand in all those places where the hard-fighting grenadiers need help for the reason that they are not able with their own weapons alone to overcome the enemy.

In the assault gun, the youngest weapon of the artillery, the infantryman has found his best helper.

An audacious decision is better than one that is too prudent. Daring decisions often bring victory, while defeat usually proceeds from those that are based on fear.

—From Colonel Frick's *Tactical Breviary,* quoted in *Revue Militaire Suisse.*

An Artillery Breakthrough

Translated at the Command and General Staff School from a Russian article by Colonel of the Guards B. Belayev, Soviet Army, in *Krasnaya Zvezda* 6 August 1943.

IN the breakthrough of the German defenses near Orel an important role was played by the artillery.

The massed fire of artillery and mortars of all calibers practically paralyzed the resistance of the Germans in the tactical zone of the defense to a depth of up to six kilometers. This fire was highly concentrated over the whole front of the breakthrough. One sector, however, was subjected to an exceptionally powerful concentration of fire. It was the Dudinsky center of resistance, which was the strongest and the one upon which depended the fate of the German defense in this area.

The Dudinsky position was situated on a commanding height. The Germans had covered it with trenches and equipped it with shelters, covered earth-and-timber emplacements, and pillboxes. The latter were all-metal emplacements with embrasures for machine guns. These were erected to cover the approaches to the hill, both frontal and flank. The network of obstacles was extremely dense here. The strength of this position in artillery was especially great. There were twenty artillery batteries in addition to forty antitank guns, which is exceptional for a narrow sector.

Our command was fully cognizant of the fact that leaving such a center of resistance without first crushing it would jeopardize the whole breakthrough. This determined the mission of the senior artillery commander—to cover the entire center of resistance, including its artillery positions, by accurate artillery fire in order to suppress completely every enemy machine gun and every artillery piece.

First of all, it was necessary to study the enemy's fire plan, and to determine the grouping of his artillery. This last task was difficult because the enemy kept maneuvering part of his batteries over a number of alternate positions. Reconnaissance in this case meant everything. If we could determine, without making any serious error, the trace of the forward edge; if we could locate all fire nests, main and alternate positions of the batteries, infantry assembly areas, and axial and lateral roads, our success would be complete. If serious mistakes were made now, no massed fire would be able to silence this position when our infantry advanced.

That is why exceptional attention was given to the locating of targets. This went on for a month, and all available means were used. Each battery prepared panoramic sketches of the target areas, which represented the results of long observation. The batteries and battalions received panoramic photographs of the sectors that had been assigned to them. The corrected photographs were continually improved. Great importance was attached to aerial photographs of both pinpoint and strip types. Thanks to this, by the way, the locations of the German stationary and roving batteries were determined.

Artillery surveys were, of course, fully employed. As to sound ranging, it played an important part in the course of the counterbattery duel. We should also note the protracted study of enemy fires—the direction of fire, density, number of shells fired, etc. Finally, reconnaissance in force, the day before the breakthrough, helped to check more exactly the artillery system of the defense, inasmuch as it had brought out the fire of the entire German artillery.

The plan of the forward edge was made by locating all detected firing positions by intersection. As a result of the constant comparison of all data, an unusually detailed and truthful picture of the targets was made, both for the forward edge and for the depth of the defense.

Since the German plan of defense is now in the possession of our command and the enemy is routed from this position, it is possible to determine the errors made by our scouts. In locating the forward edge, the

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error did not exceed seventy meters and that only in separate sectors where, on the day before the operation, the Germans slightly relocated their obstacles. As regards the firing positions, errors were negligible. These errors, of course, had no influence at all on the course of the attack.

The concentration of our artillery was carried out during the three nights preceding the breakthrough. The size of this concentration can be judged by the results of the fire. Not a single gun, not a mortar, fired at random. All the artillerymen, from the chief of section to the commander, knew their missions perfectly, which naturally enabled them to accomplish their tasks successfully. The batteries advanced their observation posts as close to the forward edge of the enemy as possible. The survey crews kept rechecking the location of targets. Metro corrections were applied to the calculated initial data. All data for adjustment fires were continually checked up to the very beginning of the attack.

The artillerymen worked day and night, putting into practice all precise methods of locating the targets and of their destruction. This proved to be, also, the fundamental cause of the great accuracy of fire, which was planned in such a manner that the massed fires alternated with adjustment and precision fires. During the final minutes before the attack the fire attained its maximum intensity. The gun crews worked with all their strength. A solid wall of smoke and dust concealed what a few hours earlier had been called the Dudinsky position of the German defenses.

In consequence, all the antitank artillery of the Germans was destroyed, and our tanks went forward unimpeded. In addition, our forces succeeded in the complete destruction of twelve enemy batteries. It was established that all the German guns were within the zone of fragmentation effect of our shells and many direct hits were scored. The trenches, shelters, and emplacements of the enemy were reduced to a heap of ruins. Accurate shelling of the assembly areas and of the rear approaches to the position enabled us to take under fire an enemy battalion which had been brought up from the reserve to help the forces in the Dudinsky position.

Only a small part of the German forces which survived the artillery preparation attempted later to offer resistance. But these were vain attempts. With the last bursts of our shells, our infantry rushed in and broke into the first and second lines of the German trenches, seized them, and, in the further enveloping maneuver, moved into the depth of the enemy position, again supported by our artillery.

Chindits—Airborne Invaders of Burma

Digested at the Command and General Staff School from an article by Brigadier General H. S. Sewell in *Britain* (British Information Services) July 1944.

SINCE the dramatic story was published in the American press of how General Orde Wingate's "Chindits" were flown into Burma by Colonel Philip Cochran's Air Commando Unit last March, little has been heard of the activities of this force, or to what extent it has helped in the general plan of the campaign.

No details of the strength of the Chindits, or the exact area which they control between Mandalay and Myitkyina, have been disclosed, and it is not likely that information of this sort will be available till after the end of the campaign. But there are factors which make the operation unique, and it has set a pattern which may well be followed in future campaigns against the Japanese.

For the first time a force of sufficient strength to take care of itself has been transported into enemy-occupied country by air

and has been maintained by air. The transportation was planned and executed by Americans, and air cover was provided by American fighter planes. Air strips in enemy country were constructed by American engineers under the protection of the British-Indian Chindits who formed the ground fighting units of the force. The plan was Wingate's and was based on his experiences last year, when he marched his men into Burma on foot. His columns operated then for more than two months behind the Japanese lines, living chiefly on supplies dropped from the air. The expedition was successful, and it has proved to be the prelude to an operation of the same nature carried out by better equipped and much stronger forces.

Cochran's Air Commando Unit was organized and equipped in the United States, and subsequently it completed its training in India, where Wingate assembled and modeled his new Chindits. The officers and men who had taken part in the expedition last year formed the nucleus of the new force. Brigadiers and colonels were selected from among those who had proved themselves good leaders in the jungle. The standard which Wingate set for his Chindits last year was very high. Only those who could pass an exacting test of endurance during training were taken on that expedition. There was very little hope of return from that expedition except for those who could march for weeks without rations.

Wingate called his men Chindits after the stone winged-dragons that guard the figure of Buddha in Burmese temples. It is a mixed force, consisting of British, Indian, Gurkha, and Burmese soldiers, the bulk being drawn from the British Isles.

Two open spaces in the jungle, where it was considered possible to land, were selected. Half the gliders were to go to each. Their crews were then to prepare the ground for transport planes which were to follow. But just before the start, it was discovered by air reconnaissance that the Japanese had completely blocked one of the chosen sites with logs and trees. Orders were changed, and all the gliders were directed to the other site. On landing it was found that the ground surface, which looked level in the reconnaissance photographs, was intersected with large trenches overgrown with elephant grass. A number of gliders crashed and almost all were damaged or destroyed. Casualties were heavy and would have been worse if the second wave of gliders had not been warned by radio in time to turn back.

There was enough equipment in the first wave to build an airfield and this was completed within a day by American engineers, covered by the Chindits who had pushed out into the jungle. There was no interference from the Japanese, and by evening the field was ready to receive the stream of transport planes, arriving with fighting troops, mules, machine guns, and equipment.

Within three weeks of the start of the operation, General Wingate was killed in a crash on a mountain side during a storm, when flying to visit one of his columns. He is succeeded by Major General Walter Lentigne, his most trusted and able lieutenant.

The Chindits have destroyed everything of military value in a wide area around Indaw, where they hold strong positions and airstrips. At Henu, north of Mawlu on the railway between Indaw and Mogaung, they have established a road and rail block. Over 1,000 Japanese are reported to have been killed at this point during their attempts to clear their lines of communication to the north. The ratio of losses is reported to have been ten to one in favor of the Chindits. In these actions Colonel Cochran's Air Commando bombers have cooperated with the Chindits by attacking enemy concentrations outside the defense perimeter of the Chindit strongholds.

Chindit activities have not been confined solely to cutting communications and operating behind the front. A part of the force has closed on Kaimaing from the south, where they are threatening the rear of the Japanese, who are blocking Stilwell's advance. Lentaigne and his Chindits have now been put under Stilwell's command. This will simplify close cooperation in the field, which has become possible now that the two forces are close to each other. It is also bad news for the Jap.

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Fighting in Enemy Rear Areas

Translated and digested at the Command and General Staff School from a Russian article by Colonel V. Derman in *Krasnaya Zvezda* (Red Star) 16 February 1944.

THE Germans are trying to build a continuous zone of defense in order to paralyze the operations of our units wedging into their battle formations. Despite all their efforts, however, they have failed to build everywhere a uniform belt of obstacles and to organize sufficient fires in all the sectors of the front. Even along the forward edge of their defenses, there may be found unoccupied gaps

easily accessible to our scouts and even to infantry units of considerable size. Very instructive in this respect are the recent operations of our troops north of the city at Novosokolniki.

In spite of our artillery preparation, part of the enemy weapons had escaped destruction. Our attacking infantry was involved in a fire fight, and the tempo of its advance had slackened even during the first phase of the battle. It was decided to throw into battle a ski unit at the junction of two attacking units, for it was here that a gap in the German defenses was discovered.

Weather was not favorable for the skiers. Snow was melting, and in many places the ground was exposed. It was decided, therefore, to leave the skis and the overcoats in the area of departure. The men were armed with submachine guns and four hand grenades each. Some men had special knives for hand-to-hand fighting, and flashlights. Guns and mortars had to be left behind—heavy weapons might hamper the mobility of the unit. The unit was supplied with several radios for communication with the higher staff and with the supporting artillery.

As the gap was rather narrow (about 700 meters), the unit split up into two groups and advanced in close formation. Silence was strictly observed, and the commands and orders were transmitted in a whisper.

Having passed beyond the forward edge of the Germans, the commander of the unit ordered the following battle formation: In front moved a reconnaissance platoon; behind it, companies deployed in line and at a distance of from 150 to 200 meters from each other; while a sapper platoon, an antitank rifle platoon, and the medical detachment marched in the rear. Two squads were detailed as flank guards.

The most complex phase of the operation was the crossing of the railway and highway northeast of the village of Manokovo (see sketch). Eight telephone wires were stretched along the road. The question arose as to whether to cut these lines or not. It would be useful to disrupt communication in the rear of the enemy, but the Germans could send up signalmen to repair the line and discover the unit. The commander decided not to touch the wires.

There was considerable motor traffic on the highway leading to Manokovo. Under these conditions it would be difficult to cross the

highway unnoticed. At first, the commander intended to cross the highway by small groups, execute a deep turning movement, and attack Manokovo from the northwest. But morning was just beginning to dawn, and such an operation carried out in daytime would exclude the element of surprise which was absolutely indispensable in this case.

Then the commander made a bold decision: to form the unit into a column, to proceed by the shortest route toward the village, and to attack it from the north and northeast. But something quite unexpected happened just at that time. A few minutes earlier, one of our patrols had reached the highway and could not resist the temptation to take a passing German car under fire. Unfortunately they missed, and the car sped away to the village. After a short while, four trucks with German infantry appeared on the road. They were moving toward the unit. To mislead the enemy, the commander gave an order to hide our Soviet automatic weapons in the camouflage robes. When the trucks approached, he gave the command in German: "Rechts-um!" and his men cleared the road. The enemy trucks were now in the middle of the column. The command "Fire" followed, and within a few seconds all the Germans were wiped out. Now it was necessary to hurry to the village in order to prevent the enemy from getting ready for the attack.

A few minutes later a light car was seen speeding toward the unit. The car was allowed to approach and was captured without a single shot. The driver of the car turned out to be the Provost Marshal of the village, wanting to know what the shooting was about. He said that the village was occupied by the headquarters of an infantry battalion and by two artillery batteries. The garrison consisted of three hundred and fifty men.

The commander's order was this: to attack the village after a short envelopment from the north, east, and south; to begin the assault without fire preparation; and to fire at close range and make wide use of hand grenades.

The unit was fired at only at the nearest approaches to the village. But the Germans fired in a disorderly manner without any harm to the attackers. Our men, firing as they advanced and shouting "hurrah," rushed into the village. The enemy artillerymen running toward their guns were killed or wounded before they managed to fire a single shot. More than one hundred and fifty enemy officers and men were killed or wounded and ninety surrendered. Our losses amounted to four killed and twelve wounded.

The first phase of the battle was finished. The commander of the unit sent the usual report to the senior commander and was ordered by radio to consolidate his positions in Manokovo and to wait for the arrival of the main forces of the division. An all-around defense was organized, and some of the German fortifications were utilized. The artillery was instructed by radio to prepare firing data for a box barrage around the village.

At 1030, three tanks and ten trucks with infantry appeared on the road from Priskukha. The morning was cloudy and misty, but we could clearly see a red flag on the head tank. This trick fooled us at first, since our tanks were expected to come from this direction. At a distance of about two hundred meters from the village the enemy tanks opened fire, while the infantry got off the trucks and rushed toward the village. A fire fight began, and soon the Germans were forced to withdraw. The tanks withdrew, too.

Thus, the first assault was repelled, but the commander knew that the Germans were likely to use all their available forces in order to liquidate the danger which had arisen in their rear. He gave orders, therefore, to perfect the all-around defense. The situation was becoming complicated. The scouts reported that tanks and an infantry company were approaching from Kazachikha while a submachine-gun company was coming from Stepanovshchina. Then there began a series of concentric attacks. Ammunition was almost exhausted, and the men were forced to use captured weapons.

Our artillery helped the unit by directing a strong fire against the enemy infantry and tanks. But the Germans were bringing up more reinforcements, and the situation of our

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unit became extremely difficult. A battalion sent by the division commander to help the unit was engaged in a battle somewhere near Volgino, and the tempo of its advance was slow.

A furious battle raged all day. At dusk, enemy tanks and infantry penetrated into the northern outskirts of the village. The commander radioed the artillery to fire on the village. By that time the main forces of the unit had occupied the German trenches in the southeastern outskirts. One company went to the opposite side, and the fire control personnel took cover in a concrete pillbox. The fire of our artillery was intense and accurate. Panic stricken, the Germans began running about the village. They suffered heavy losses and soon were forced to withdraw. This happened partly because by that time the battalion had reached the area of Manokovo. Together with the ski unit, it began to widen our area around the village.

What conclusions are to be drawn from the above engagement?

In breaking through German defenses, it is expedient, in some cases, to concentrate large forces on a narrow sector of the front, pierce the enemy position, and throw mobile units into the breach. Subsequently, combining frontal attacks with the operations in the rear of the enemy, the attackers will be in a position to cut up enemy battle formations. This will force the Germans to change the disposition of their units and to fight under unfavorable conditions. This was precisely the situation in the given case. Our main forces soon reached Manokovo and, operating along the defensive zone of the enemy (north and south), cleared a considerable area of Germans.

It should be noted that the route into the depth of the enemy defenses can be found only by reconnaissance and observation. This is confirmed by the above engagement. For several days before the operation, our officers conducted careful observation of the enemy and determined the location of gaps in his defenses. Subsequent events proved that the findings of the observers were correct.

In most cases, penetrations into enemy battle formations are carried out at night. The routes, therefore, should be marked in advance. It is also necessary to select various landmarks for orientation, and to determine the azimuths for the movement. It is advisable to instruct the men as to the various stages of the forthcoming operation.

The action of the unit at Manokovo proves that, even when a unit is cut off from its main forces, it is possible to maintain communication with the artillery and to adjust its fire by radio. But does it mean that the infantry may be sent without artillery weapons to the rear of the enemy? Not at all. No matter how difficult the situation may be, the infantry unit should always have at least a few small-caliber guns and mortars. Had the ski unit in the above example had these weapons it could have radically changed the entire course of the battle.

In operations of this type, the staff of the higher unit should keep the commander of the unit that is fighting in the depth of the enemy defenses informed of the changes in the situation. The fact that German tanks were assumed to be ours was partly the fault of the staff. It should have informed the commander that our tanks could not possibly use the route taken by the German tanks.

It should also be noted that the commander of the unit failed to mine the road north of the village of Manokovo, although he had antitank mines at his disposal.

Being cut off from their bases, mobile units often curtail their activities because of shortage of ammunition. This indicates the necessity of using portage boats and dogs for transportation of ammunition.

Those to whom difficulties are an excuse for inaction instead of a challenge to their will power are unlikely to show in battle the necessary determination.

—Major General Costello in *An Cosantóir*.

Thoughts on the Training of German Soldiers

Translated at the Command and General Staff School from a German article by Captain H. K. Schulz, German Army, in *Die Panzertruppe* October 1943.

MAN is the product not of his environment but of his will, of his attitude. This is the point at which military training must be directed. The task is lightened because of the fact that the training in the Hitler Youth and in present-day schools follows the same aim. But perhaps many times the value of this work is overestimated. One should take into consideration the fact that during the time he belongs to the Hitler Youth, the boy is in the midst of his growing period. This growth can be directed, it is true, in a certain direction, but complete success will not always be achieved. We will put it this way: the preliminary soldierly training will prepare the way for the soldierly attitude, and the soldierly attitude itself will be the basis of training with the armed forces. We must always bear the fact in mind that total war requires decision, clarity, and in all matters the greatest of hardness. As a result of this, one does not dare to act in too "psychological" a manner—this easily leads to softness and yielding. Hardness can be attained only by means of hardness.

Example is more effective than all words and explanations. The officer must always remember this. The words of Walter Flex—that setting the example is the hard part—must always remain alive in his consciousness. Unless the officer sets the example, all his training efforts will remain incomplete. To use an old Prussian saying, "an officer is always on duty." He must never think that he can act differently off duty than on duty. "Confidence is the basis of obedience; obedience is the basis of the armed forces." Confidence will soon be gained by the example set by the officer in all the large and small things of life.

It is also necessary that the officer be concerned about the private life of the man. Negligence in service, for example, may not always be the result of laxity or bad will. Perhaps there have been air attacks on his home and his family has lost everything, or perhaps he has some other worries. When one of the soldiers gets into bad ways with thoughts that lead him away from comradeship, punishment or correction alone will not help. It is more important to learn the cause, then point out to the man that it is not the outward manifestation of his improper attitude that is being combated but its causes. He will have confidence because he has seen that "his officer is interested in him." Another way to awaken confidence in a man is to have confidence in him, to give him tasks to perform that he must solve in some manner by himself. He will be proud of this and make an effort to show himself worthy of this trust.

In this way, the foundation should be built up on which obedience rests. This is a field in which there can be no compromises. A man who has confidence in his officer knows that the latter acts in a superior manner and will never require anything that is unnecessary or impossible. He must also know positively that a command is always sufficient in itself and that explanations or excuses for it are forbidden. In the same way that the person who trains with nothing but light weights is not able to lift heavy weights, so the man who fulfils only easy commands is not able to master hard missions. The officer should never overlook even the slightest departure from obedience.

The last sentences will perhaps have awakened in the minds of some the infamous concept of blind obedience. A few words concerning this. We want no hordes who dully and dumbly trot along the commanded way without an opinion or will of their own. Rather we desire men who do some thinking with regard to the orders they have received. But for this, the soldierly manner of thinking is a prerequisite. Again this can only be attained when thinking in civilian concepts has ceased to exist. Therefore, first of all,

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"civilian thinking" must be got rid of as quickly as possible in order to give to the man, who for the time being is without will, the basis on which he now will build up his soldierly thinking.

Why is this soldierly thinking necessary? It is a well known fact that one willingly takes up any work, be it ever so hard, when one is convinced in his heart of its rightness and necessity. On the other hand, even the smallest task becomes torment when one attacks it with no knowledge of its nature, and above all without conviction. Military life, however, is different from private life in which every man lives in his own way. He who takes the oath to the Prussian flag has nothing more that belongs to himself. Soldiery requires the whole man, all his thinking and feeling. It is important not to permit any bitterness of heart to develop during this transformation period. One always mourns for anything that one has hung on to and is suddenly forced to give up. During this stage the gaze of the young soldier must be directed forward. As quickly as possible the foundation for soldierly thinking must be laid. Once this has been established, a word of praise often helps the soldier to speed up his progress. And now the young soldier whose own will, whose own thinking, is soldierly, will act of his own accord in a soldierly manner, work out problems that have been assigned to him, and possess an inner impulse to perform all his tasks.

Naturally, there will be exceptions. In a nation of ninety million inhabitants there will always be a few who look upon the bearing of arms not as an honor but as a burdensome compulsion. This attitude on their part does not always appear in a troublesome form and can quickly be eliminated by appropriate and firm measures. But it is a more troublesome matter when these exceptional cases produce a disorganizing effect in their unit by giving others a bad example. They are able in this way to annul the effects of valuable efforts. It will be the task of the officer to straighten out these elements with all the means at his disposal. If kindness does not accomplish the purpose, the greatest severity is ordered, for it is not the individual but the whole that is important.

A quiet life is more comfortable than one which daily requires the exertion of all one's forces. But a soldier, especially at the present time, cannot afford to let a day go by in which the exertion of his strength is not required. It is the task of the officer to make provision for this each day. If one now and then slacks up on the reins, many of our soldiers will get the idea that "after all it doesn't matter." It is hard and often unpleasant, but there can be no laxity on this point for the officer. In this logical structure—the creation of mutual confidence (the development of soldierly thinking on the basis of confidence) and of unqualified obedience (unqualified because on the basis of soldierly thinking it is regarded as right) —the aim of soldierly training has been reached.

In concluding, we desire once again to summarize what we have said:

1. It is wrong in time of war for the officer to be merely a trainer and not an educator.

2. From his education, his actions proceed. We must, therefore, in soldierly education, make use of the greatest hardness in order to acquire men who will remain hard in difficult situations.

3. In the officer who demands hardness in others, hardness is naturally a prerequisite.

4. Confidence between officer and man is possible only when the officer sets the example in all things.

5. All service is performed cheerfully when one is convinced of its rightness. Therefore it must be the first aim in education to bring the man to the point where he will learn to think in a soldierly manner. Confidence in the officer will help a great deal in this.

6. It is necessary constantly to emphasize the fact that obedience is the foundation on which the armed forces are established. With confidence in the one who issues the orders, the man will always obey.

7. Infractions of discipline and insubordination are to be suppressed immediately and with the greatest severity. The whole is of more importance than the individual.

Development of "Blockbuster" Bombs

Digested at the Command and General Staff School from an article by Flight-Lieutenant John Bentley, RAF, in *Britain* (British Information Services) July 1944.

AT the outbreak of war, the biggest bomb to issue from an ordnance factory in Britain was a 500-pounder. A good proportion of the loads carried by the aircraft then at the disposal of RAF Bomber Command consisted of mere 250-pound bombs; today, bomb-carrying capacity has been increased to staggering proportions. The latest type Mosquito, incredibly fast even as a fighter-bomber (and puny in size compared with Wellington and Whitley heavy bombers of even early design), can now carry a 4,000-pound bomb!

Ballistic tests showed that a large bomb could be made much more destructive with a thin casing and a heavy weight of explosive, relying entirely on the effect of blast.

Development, therefore, proceeded along these lines. With the 1,000-pound bombs which were brought into use not long after the start of the war, the explosive content rose to something like thirty-eight percent of the total weight. With the arrival of the RAF's 2,000-pound, 4,000-pound, and 8,000-pound "cookies," the actual destructive charge increased very sharply to a proportion of seventy or seventy-five percent of the total weight, leaving a mere twenty-five percent for the thin casing.

The terrific blast generated by the latest 12,000-pound bombs recently used against the Gnome Rhône works at Limoges, in France, caused entire buildings to disintegrate and collapse into rubble. These bombs are not designed to penetrate, but to obliterate everything within a very large radius of the point of explosion. Nothing like the damage would be achieved by relying on the effect of fragmentation from a heavy metal casing.

The policy of using giant, thin-walled blast bombs was naturally dictated by bomber strategy, since they are mostly dropped on land targets where penetration is unimportant.

Blast in itself results from a sudden and tremendous displacement of air which causes a "cushioning"—or a compression—of the atmosphere into a density so solid that it almost takes on a material quality. These air "cushions"—momentarily endowed with rock hardness—move out in waves, sweeping everything before them and leveling out the toughest buildings. Next, in the wake of the blast waves, comes a vacuum resulting from the displacement of air. This vacuum has an unbelievably powerful suctioning effect. Windows, doors and any other objects that do not form an integral part of a structure are simply ripped out and hurled hundreds of yards away.

The fire caused by the bomb is immediately fanned into a roaring furnace as the displaced air sucks the flames along after it, causing them to spread in all directions and take a fresh hold on any combustible material.

Detonation is the most rapid version so far known of the process of burning. In other words, explosion is an accelerated form of burning, while detonation is an accelerated form of explosion. Various forms of "initiators" were tried on giant blast bombs with the single object of getting them to detonate instantaneously and completely. Their job is to ensure that *every bit* of the bomb's explosive content goes off at once.

The ratio of destructiveness of a bomb is not necessarily relative to its size. If there is a fractional delay in the detonation of one or more parts of its charge, it will result in a "splitting up" of the blast intensity and a consequent reduction in efficiency. In theory, a 12,000-pound bomb made up of twenty-four cells, each of 500 pounds, detonated *simultaneously*, would be the most desirable aim, but technical difficulties exist which preclude such an arrangement in practice.

The importance of simultaneous detonation was proved when it was discovered that a

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single 12,000-pounder going off with one big bang did much more damage than three 4,000-pounders detonating at split-second intervals.

Much work was devoted to the improvement of ballistics in these big bombs. For the bomb sight in the aircraft to do its aiming job efficiently, the trajectory of the great mass hurtling earthward had to be exactly as predicted. It was not simply a question of the bomb hitting the ground nose downward, but of ensuring that its arc of travel through space conformed with mathematical accuracy to predetermined calculations.

A small bomb of limited frontal area falls through space in a much steeper arc than a "cookie" with its vast and relatively crude bulk. The length of travel of the "cookie" after release was a factor that not only needed to be gauged precisely, but had to be relied on not to vary beyond prescribed limits.

From the outset it was obvious that a 4,000-pounder designed along the same lines as a 250-pounder and with a casing of proportionately greater thickness, simply would not go into any existing bomb bay. Therefore, "blockbusters" were given a much squatter shape so that they could be stowed more easily into the deep belly of the bomber. The advent of thin casings led bomb designers to explore the possibilities of blast destruction rather than destruction by shrapnel, with the results already described.

Again, bomb stowage problems brought in other factors which required careful study. Chief among these was the suspension of the bomb in the aircraft whilst in flight, on the way to the target. No liberties whatever can be taken with the bomb release mechanism where missiles of 4,000 pounds are concerned —let alone 8,000 and 12,000-pounders. The suspension points must be evenly distributed *above* the center of gravity, to prevent unequal strain being thrown upon them during violent evasive or other maneuvers while in flight.

At first, RAF Wellingtons and Whitleys had to be fitted with special racks to carry the new "blockbusters," but as their success became assured, structural alterations were made to bombers during production, with a consequent saving of labor and time. A large bomb carrier was substituted for the multiple small ones then in use, and appropriate beams, hoists, and winches were designed for loading the new bombs. The problem was soon overcome, and nowadays heavy bombers of the RAF are fitted with racks which can be adapted to carry almost any combination of loads.

If we wage war with all our strength, our subordinate commanders and even our troops (especially if they are not used to warfare) will frequently encounter difficulties which they declare insurmountable. They find the march too long, the fatigue too great, the provisions impossible. If we lend our ear to all these "difficulties," as Frederick II called them, we shall soon succumb completely, and instead of acting with force and determination, we shall be reduced to weakness and inactivity.

To resist all this we must have faith in our own insight and convictions. At the time, this often has the appearance of stubbornness, but in reality it is that strength of mind and character which is called firmness.

—Carl von Clausewitz